SONY

IMX CAMCORDER

MSW-900
MSW-900P

SDI OUTPUT BOARD
MSDW-902

PICTURE CACHE BOARD
MSDW-903

ANALOG COMPOSITE INPUT BOARD
MSDW-904

MPEG IMX Tele-File MEMORY STICK

MAINTENANCE MANUAL
Volume 1 1st Edition (Revised 2)
Serial No. 10001 and Higher : MSW-900 (SY)
Serial No. 40001 and Higher : MSW-900P (SY)

⚠警告

このマニュアルは，サービス専用です。
お客様が，このマニュアルに記載された設置や保守，点検，修理などを行うと感電や火災，人身事故につながることがあります。
危険をさけるため，サービストレーニングを受けた技術者のみご使用ください。

⚠WARNING

This manual is intended for qualified service personnel only.
To reduce the risk of electric shock, fire or injury, do not perform any servicing other than that contained in the operating instructions unless you are qualified to do so. Refer all servicing to qualified service personnel.

⚠WARNUNG

Die Anleitung ist nur für qualifiziertes Fachpersonal bestimmt.
Alle Wartungsarbeiten dürfen nur von qualifiziertem Fachpersonal ausgeführt werden. Um die Gefahr eines elektrischen Schlages, Feuergefahr und Verletzungen zu vermeiden, sind bei Wartungsarbeiten strikt die Angaben in der Anleitung zu befolgen. Andere als die angegeben Wartungsarbeiten dürfen nur von Personen ausgeführt werden, die eine spezielle Befähigung dazu besitzen.

⚠AVERTISSEMENT

Ce manual est destiné uniquement aux personnes compétentes en charge de l'entretien. Afin de réduire les risques de décharge électrique, d'incendie ou de blessure n'effectuer que les réparations indiquées dans le mode d'emploi à moins d'être qualifié pour en effectuer d'autres. Pour toute réparation faire appel à une personne compétente uniquement.

CAUTION

Danger of explosion if battery is incorrectly replaced.

Replace only with the same or equivalent type recommended by the manufacturer.
Dispose of used batteries according to the manufacturer's instructions.

Vorsicht!

Explosionsgefahr bei unsachgemäßem Austausch der Batterie.

Ersatz nur durch denselben oder einen vom Hersteller empfohlenen ähnlichen Typ. Entsorgung gebrauchter Batterien nach Angaben des Herstellers.

ATTENTION

Il y a danger d'explosion s'il y a remplacement incorrect de la batterie.

Remplacer uniquement avec une batterie du même type ou d'un type équivalent recommandé par le constructeur.
Mettre au rebut les batteries usagées conformément aux instructions du fabricant.

ADVARSEL!

Lithiumbatteri-Eksplosionsfare ved fejlagtig håndtering.
Udskiftning må kun ske med batteri af samme fabrikat og type.
Levér det brugte batteri tilbage til leverandøren.

ADVARSEL

Lithiumbatteri - Eksplosjonsfare.
Ved utskifting benyttes kun batteri som anbefalt av apparatfabrikanten.
Brukt batteri returneres apparatleverandøren.

VARNING

Explosionsfara vid felaktigt batteribyte.
Använd samma batterityp eller en likvärdig typ som rekommenderas av apparattillverkaren.
Kassera använt batteri enligt gällande föreskrifter.

VAROITUS

Paristo voi räjähtää jos se on virheellisesti asennettu.
Vaihda paristo ainoastaan laitevalmistajan suosittelemaan tyyppiin.
Hävitä käytetty paristo valmistajan ohjeiden mukaisesti.

For the customers in the Netherlands
Voor de klanten in Nederland

Hoe u de batterijen moet verwijderen, leest u in de tekst van deze handleiding.

Gooi de batterij niet weg maar lever deze in als klein chemisch afval (KCA).

NL

Für Kunden in Deutschland

Entsorgungshinweis: Bitte werfen Sie nur entladene Batterien in die Sammelboxen beim Handel oder den Kommunen. Entladen sind Batterien in der Regel dann, wenn das Gerät abschaltet und signalisiert "Batterie leer" oder nach längerer Gebrauchsdauer der Batterien "nicht mehr einwandfrei funktioniert". Um sicherzugehen, kleben Sie die Batteriepole z.B. mit einem Klebestreifen ab oder geben Sie die Batterien einzeln in einen Plastikbeutel.

For the customers in the U.S.A. and Canada

RECYCLING LITHIUM-ION BATTERIES

Lithium-Ion batteries are recyclable. You can help preserve our environment by returning your used rechargeable batteries to the collection and recycling location nearest you.

For more information regarding recycling of rechargeable batteries, call toll free 1-800-822-8837, or visit http://www.rbrc.org/

Caution: Do not handle damaged or leaking Lithium-Ion batteries.

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Manual Structure

Purpose of this manual

This manual is the maintenance manual volume 1 of IMX Camcorder MSW-900/900P.

This manual is intended for use by the trained system engineers and service engineers. The volume 1 describes the information (periodic inspection and maintenance, diagnosis, part replacements and adjustment procedures) on the premise of component level service.

Related manuals

Beside this Maintenance Manual Volume 1, the following manuals are available for the unit.

- **Operation Manual (Supplied with this unit)**
  This manual is necessary for application and operation of this unit.
  Part number: 3-206-082-0X

- **Maintenance Manual Volume 2 (Available on request)**
  This manual is intended for use by the trained system engineers and service engineers, and describes the information (parts list, semiconductor pin assignments, block diagrams, schematic diagrams and board layouts) on the premise of component level service.
  For obtaining, contact your local Sony Sales Office/Service Center.
  Part number: 9-968-595-0X

- **BVF-V20W/V20WCE Maintenance Manual (Available on request)**
  This manual is the maintenance manual of the supplied viewfinder.
  This manual is intended for use by trained system and service engineers, and describes the information regarding the service overview, electrical alignment, parts list, semiconductor pin assignments, block diagrams, schematic diagrams and board layouts.
  For obtaining, contact your local Sony Sales Office/Service Center.
  Part number: 3-191-094-1X

- **"Semiconductor Pin Assignments" CD-ROM (Available on request)**
  This "Semiconductor Pin Assignments" CD-ROM allows you to search for semiconductors used in B&P Company equipment.
  Semiconductors that cannot be searched for on this CD-ROM are listed in the maintenance manual for the corresponding unit. The maintenance manual contains a complete list of all semiconductors and their ID Nos., and thus should be used together with the CD-ROM.
  Part number: 9-968-546-XX

Contents

The following is a summary of the sections of this manual.

Section 1 Service Overview
Describes the location of major parts, on-board switches, tools, fixtures, measuring equipment, adjustments/setups after board replace, etc.

Section 2 Periodic Maintenance and Inspection
Describes the cleaning method of various parts, periodic inspection list, etc.

Section 3 Error Diagnostics
Describes the error codes, error messages, etc.

Section 4 Setup Menu
Describes the setup menu, etc.

Section 5 File System
Describes the file structure, etc.

Section 6 Parts Replacement
Describes the replacement procedure of circuit board, CCD unit, connectors, switches and others.

Section 7 Part Replacement of Mechanical Deck Assembly
Describes the replacement procedure of the parts on the mechanical deck assembly.

Section 8 Mechanical Adjustment
Describes the tape run adjustments and others that are necessitated after replacement of mechanical parts as described in section 7.

Section 9 Camera System Electrical Alignment
Describes the camera system electrical alignment for general camera maintenance and adjustment after replacement of parts.

Section 10 Electrical Alignment of VTR System
Describes the VTR system electrical alignment for general VTR maintenance and adjustment after replacement of parts as described in sections 6 and 7.

Section 11 VTR Maintenance Mode
Describes the VTR maintenance mode that is required during VTR maintenance and error diagnosis.

Section 1
Service Overview

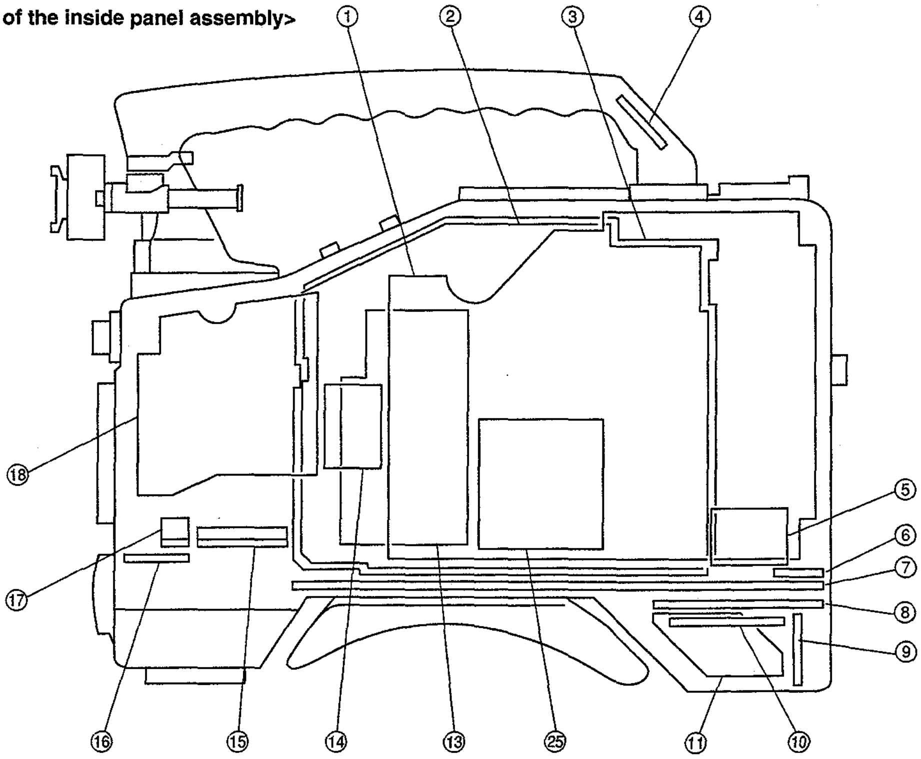
1-1. Locations of Main Parts and Circuit Configuration

1-1-1. Circuit Configuration and Locations of the Printed Wiring Boards

System Configuration	Board Name	Circuit Function	No.
CCD Block	PA-271	Pre AMP	㉚
	PS-614	Power Supply	㉜
	SE-641	Sensor	㉝
	TG-227	Timming Generator	㉞
	VA-208	Video AMP	㊹
Camera System	AT-143	System Control	⑬
	DCP-35	Camera Processor	②
Video Signal System	DVP-20	VTR Processor	③
Audio System	AL-43	Audio AMP	⑩
	APR-59	Audio Processor	⑱
	AXM-24	Connector	⑨
	FP-121A	Analog Audio Processor	①
	IFA-11	Lens Control	㊱
System/Servo Control	MDC-13A	Mecha Deck Control	⑳
	MDR-14	Drum Motor Drive	㉑
	SE-613	Sensor	㉙
	SS-92	Servo/System Control	⑲
RF System	EQ-88	Equalizer	㉗
Power Supply	CNB-15	Circuit Breaker	⑧
	DC-111	Battery DC Filter	⑥
	RE-186A	Regulator	㊵
	RE-187A	Regulator	㊴
Connector Box	IO-202A	In/Out	⑪
	LP-114	Rear Tally	④
	RM-188	Connector (RM)	㉔
Mic	MA-103A	Mic AMP	㊲

System Configuration	Board Name	Circuit Function	No.
Others	BP-33	Battery	⑭
	CCM-45	TELE-FILE	㉓
	CI-31	40pin adaptor Interface	㊸
	ENC-61	Rotary Encoder	⑰
	HN-277	Harness	㊳
	HP-103	Headphone	⑯
	HP-104	Headphone	⑤
	IF-794	Interface	㊶
	KY-475	Function Key	㉘
	MB-898	Motherboard	⑦
	PS-595	Power Supply (Light)	㉒
	RX-54	Wireless Receiver Interface	㊷
	SW-1030	Light Switch	㉛
	SW-1031	Switch	㉟
	SW-1038	Switch	⑮
Option	DIF-113 (MSDW-902)	SDI Output Board	㉕
	MY-104 (MSDW-903)	Picture Cache	㉖
	IV-55 (MSDW-904)	Composite Video Input Board	⑫

<View of the inside panel assembly>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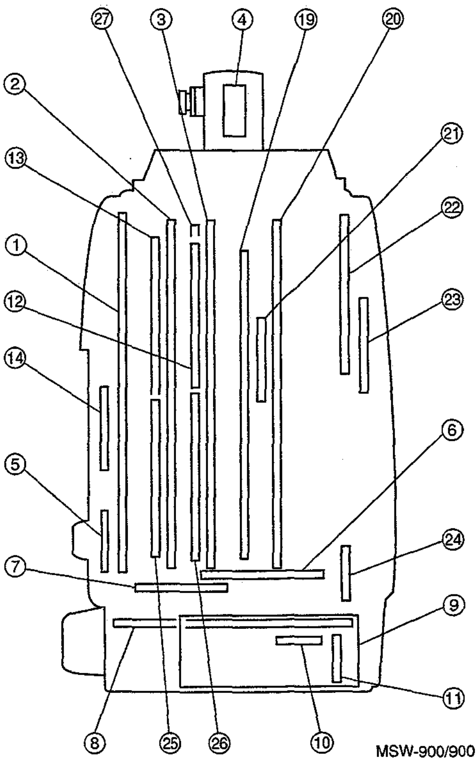
<Rear view>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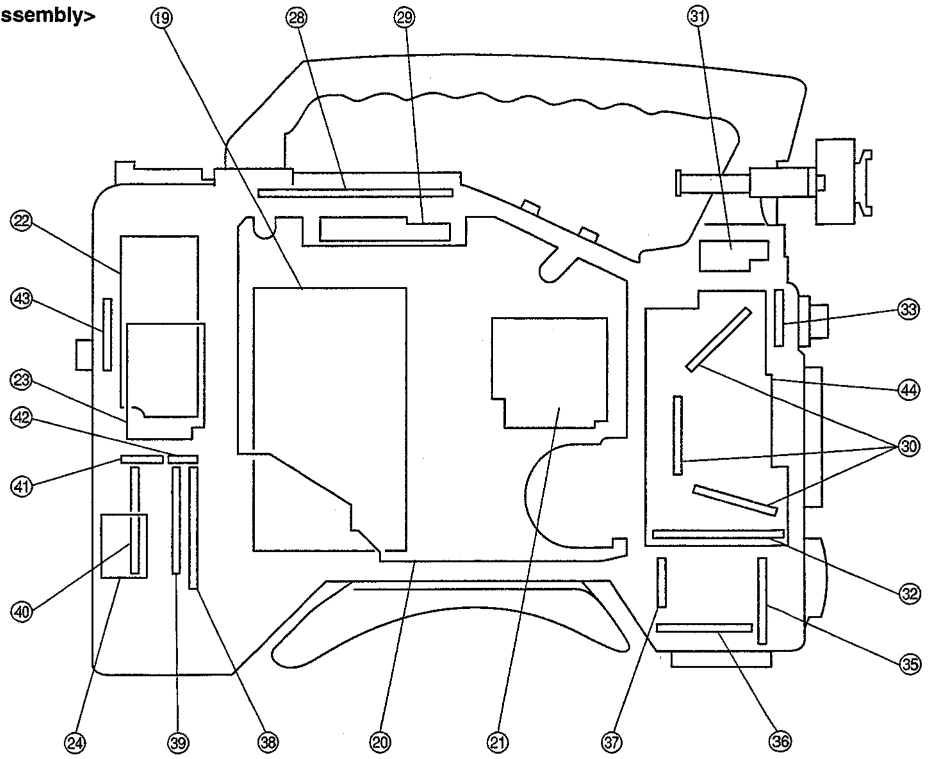
<View of the outside panel assembly>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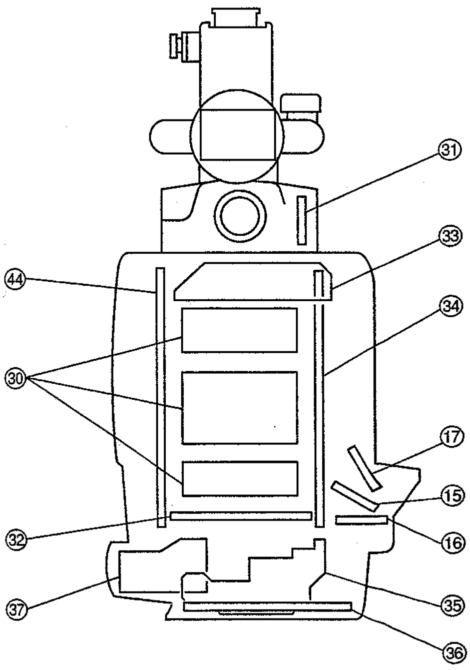
<Front view>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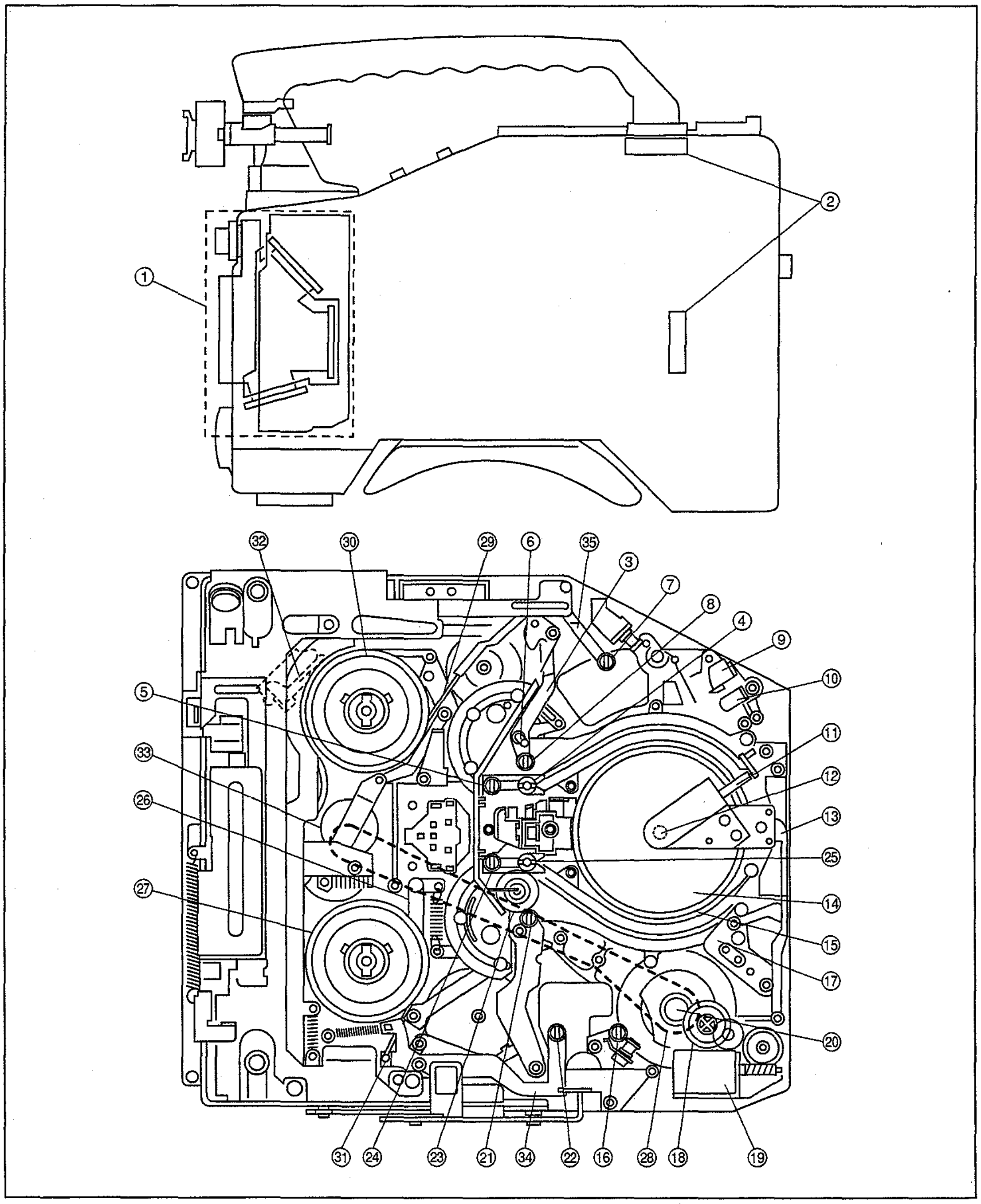
1-1-2. Locations of Main Mechanical Parts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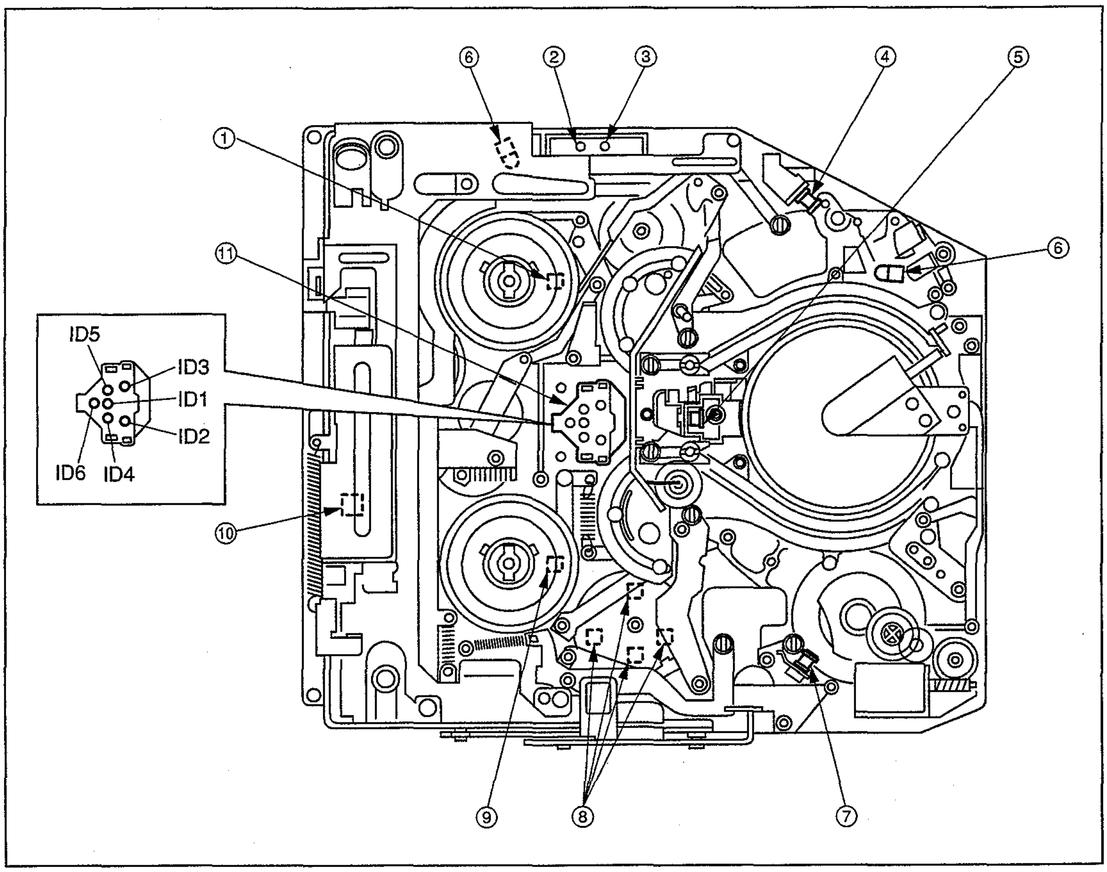
① CCD block
② Fan motor
③ Threading arm assembly
④ S1 tape guide (on top of S-slider assembly)
⑤ S2 tape guide (on top of S-slider assembly)
⑥ S4 tape guide (on top of threading arm assembly)
⑦ S5 tape guide (on top of S-tension regulator assembly)
⑧ S3 tape guide (on top of threading arm assembly)
⑨ Full erase head
⑩ CTL head
⑪ Brush assembly
⑫ Slip ring assembly
⑬ Cleaning assembly
⑭ Upper drum
⑮ Lower drum
⑯ T4 guide
⑰ TC head
⑱ Manual eject gear
⑲ Loading motor
⑳ Capstan motor
㉑ T3 tape guide
㉒ T5 guide (on top of T-tension regulator assembly)
㉓ Pinch roller assembly
㉔ T2 tape guide (on top of T slider assembly)
㉕ T1 tape guide (on top of T slider assembly)
㉖ (T) soft brake
㉗ T reel table assembly
㉘ Timing belt
㉙ S-tension regulator band assembly
㉚ S reel table assembly
㉛ T-tension regulator band assembly
㉜ (S) soft brake assembly
㉝ Reel drive gear assembly
㉞ T-tension regulator assembly
㉟ S-tension regulator assembly

1-1-3. Functions and Locations of Sensors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ID5
ID3
ID1
ID2
ID6
ID4
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⑦

① S-reel table assembly rotation sensor
Detects rotation of the supply reel table with the use of the S-reel table assembly rotation sensor. The output of this sensor is input to the servo circuit where diameter of the remaining tape is calculated.

② Cassette-in sensor
Detects whether a cassette is inserted or not.

③ REC INHIBIT sensor
Detects REC INHIBIT plug of a cassette tape.

④ Tape end sensor
Detects the tape end of a tape that is running in the FWD direction.

⑤ Full top sensor
Detects whether the inserted cassette tape is in the full top position or not.

⑥ Humid sensor
Detects the dew condensation inside the unit.

⑦ Tape top sensor
Detects the tape end of a tape that is running in the REV direction.

⑧ Function cam sensor
Detects the rotary position of the function cam.

⑨ T-reel table assembly rotation sensor
Detects rotation of the take-up reel table with the use of the T-reel table assembly rotation sensor. The FG generator output of this sensor is input to the servo circuit where diameter of the remaining tape is calculated.

⑩ Cassette lock sensor (switch)
Detects whether the cassette compartment assembly is locked or not.

⑪ Cassette ID sensor

ID1 :	Tape type Detects the tape type (Oxide or Metal).
ID2 :	Tape thickness Detects thickness of the tape that is wound in the cassette tape inserted in the set, with the use of the tab on the rear of a cassette tape.
ID3 :	Reel hub diameter The reel hub diameter of a cassette tape is different depending on the length of a tape that is wound in the cassette tape. The reel hub diameter sensor detects the reel hub diameter with the use of a tab on the rear of a cassette tape.
ID4 to 6 :	Tape format Detects whether a cassette conforms to the IMX format or not.

1-2. Matching Connectors

Use the following connectors at the ends of the cables when connecting the cables during installation and maintenance, or alternately use the following cables.

Panel indication	Matching connectors/cables
GENLOCK IN (RETURN) TC IN TC OUT TEST OUT VIDEO OUT	1-569-370-12 Plug, BNC
AUDIO IN CH1/CH2	1-508-084-00 XLR 3-pin, male
AUDIO OUT	Audio cable (XLR 5 pin-XLR 3-pin, 2 m) CCXA-53 made by Sony or equivalent
MIC IN +48 V	1-508-084-00 XLR 3-pin, male
DC IN	1-508-362-00 XLR 4-pin, female
DC OUT 12 V	1-566-425-11 round type 4-pin, male
REMOTE	1-766-848-11 round type 8-pin, male
EARPHONE	Mini jack (separately available)
LIGHT	Power tap (OE) Made by ANTONBAUER Inc., 33710 or equivalent
WIRELESS RECEIVER IN	WRR-855A (by Sony) only connectable **Note** Do not connect with a connector/ cable other than above.

1-3. Signal Inputs and Outputs

Inputs

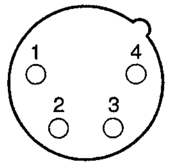
GENLOCK IN (RETURN) : 1.0 V p-p, 75 Ω
TC IN : 0.5 V to 18 V p-p, 10 kΩ

Outputs

TEST OUT : 1.0 V p-p, 75 Ω unbalanced
VIDEO OUT*1 : VBS 1.0 V p-p, 75 Ω unbalanced, or SDI 0.8 V p-p, 75 Ω, 270 Mbps
TC OUT : 1.0 V p-p, 75 Ω
EARPHONE : 8 Ω or more, −∞ to −18 dBu variable

*1 : Selected by the REAR BNC OUTSEL in the OUTPUT SEL page of the menu. When MSDW-902 is installed.

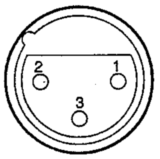
DC IN : XLR, 4-pin (Male)



– EXT VIEW –

No.	Signal	I/O	Specifications
1	GND	–	GND for BATT OUT (+)
2	–		No connection
3	–		No connection
4	BATT OUT (+)	IN	+11 to 17 V dc

AUDIO IN CH-1, CH-2 : XLR, 3-pin (Female)

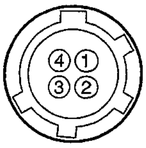


– EXT VIEW –

(0 dBu = 0.775 V rms)

No.	Signal	I/O	Specifications
1	MIC/LINE (G)	–	–60 dBu/+4 dBu, selectable High impedance, Balanced
2	MIC/LINE (X)	IN	
3	MIC/LINE (Y)	IN	

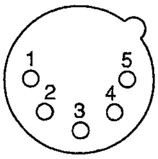
DC OUT 12 V : DIN, 4-pin (Female)



– EXT VIEW –

No.	Signal	I/O	Specifications
1	UNREG GND	–	GND for POWER
2	–		No connection
3	–		No connection
4	UNREG +12 V	OUT	+11 to 17 V dc

AUDIO OUT : XLR, 5-pin (Male)

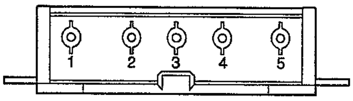


– EXT VIEW –

(0 dBu = 0.775 V rms)

No.	Signal	I/O	Specifications
1	ANALOG GND	–	
2	AUDIO CH-1 (X)	OUT	0 dBm (600 Ω terminated)
3	AUDIO CH-1 (Y)	OUT	
4	AUDIO CH-2 (X)	OUT	
5	AUDIO CH-2 (Y)	OUT	

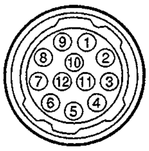
BATT IN : 5-pin (Male)



– EXT VIEW –

No.	Signal	I/O	Specifications
1	BATT (–)	IN	
2	BATT ID	IN	
3	BATT REM	IN	
4	LIGHT CONT	OUT	
5	BATT (+)	IN	+11 to 17 V dc

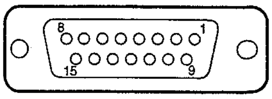
LENS : 12-pin (Female)



– EXT VIEW –

No.	Signal	I/O	Specifications
1	RET (SW)	IN	ON : 0 V, OFF : OPEN
2	VTR TRIG	IN	ON : 0 V, OFF : OPEN
3	LENS GND	–	
4	AUTO +5 V	IN	AUTO : +5 V, MANU : 0 V or OPEN
5	IRIS CONT	OUT	+3.4 V (F16) to +6.2 V (F2.8)
6	UNREG +12 V	OUT	+11 V to 17 V
7	IRIS PSTN	IN	+3.4 V (F16) to +6.2 V (F2.8)
8	REMOTE/LOCAL	OUT	AUTO IRIS : 0 V MANUAL IRIS : +5 V
9	EXTENDER	IN	EX 2 ON : 0 V EX 0.8 ON : +1.8 V OFF : +4.8 V
10	ZOOM PSTN	IN	WIDE : 2 V, TELE : 7 V
11	LENS RX		
12	LENS TX		

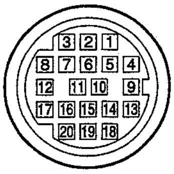
WIRELESS RECEIVER IN : D-sub, 15-pin (Female)



– EXT VIEW –

No.	Signal	I/O	Specifications
1	GND	–	GND for AUDIO IN
2	AUDIO IN	IN	WIRELESS RECEIVER AUDIO IN
3	–		
4	DC +7V OUT	OUT	
5	GND	–	
6	–		
7	–		
8	GND	–	
9	WRR CLK	IN	WRR SERIAL CLOCK
10	CS	OUT	WRR SELECT
11	WRR DI	OUT	WRR SERIAL IN
12	WRR DO	IN	WRR SERIAL OUT
13	–		
14	EXT OSC	OUT	–
15	OSC GND	–	

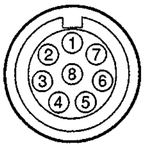
VF : 20-pin (Female)



– EXT VIEW –

No.	Signal	Specifications
1	VTR SAVE OUT	L : Light on, OPEN : Light off
2	ABNORMAL OUT	L : Light on, OPEN : Light off
3	16:9/4:3 OUT	H : NORMAL (4:3) L : WIDE (16:9)
4	REC (L) OUT	H : Light on, L : Light off
5	COLOR VF DET IN	H : Color, L : B/W
6	CCIR/EIA OUT	H : CCIR, L : EIA
7	DISPLAY ON IN	OPEN : ON, L : OFF
8	G TALLY OUT	H : Light on, L : Light off
9	–	
10	Y (X) OUT	1 Vp-p, VF : Zi=1 kΩ
11	ZEBRA ON IN	H : OFF, L : ON
12	VIDEO (X) OUT	1 Vp-p, VF : Zi=1 kΩ
13	AUDIO CTL IN	
14	B-Y (Y) OUT	700 mVp-p, VF : Zi=1 kΩ, 75% color-bars
15	R-Y (X) OUT	700 mVp-p, VF : Zi=1 kΩ, 75% color-bars
16	BATT IND OUT	H : Light on, L : Light off
17	REC/TALLY OUT	H : Light on, L : Light off
18	+9.3 OUT	REG +9.3 V
19	GND	
20	UNREG OUT	+11 V to 17 V

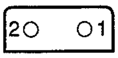
REMOTE : 8-pin (Female)



– EXT VIEW –

No.	Signal	I/O	Specifications
1	TX RCP DATA (X)	OUT	SERIAL DATA OUT
2	TX RCP DATA (Y)	OUT	SERIAL DATA OUT
3	RX RCP DATA (X)	IN	SERIAL DATA IN
4	RX RCP DATA (Y)	IN	SERIAL DATA IN
5	VIDEO (G)	–	GND for VIDEO
6	UNREG +12 V	OUT	+11 V to 17 V
7	UNREG (GND)	–	GND for UNREG
8	VIDEO (X)	OUT	1.0 V p-p, Zo = 75 Ω
	CHASSIS GND	–	CHASSIS GND

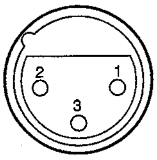
LIGHT : 2-pin (Female)



– EXT VIEW –

No.	Signal	Specifications
1	LIGHT +12 V OUT	50 W MAX
2	GND	

MIC IN : XLR 3-pin (Female)



– EXT VIEW –

(0 dBu = 0.775 V rms)

No.	Signal	Specification
1	MIC IN (G)	−60 dBu High impedance balance
2	MIC IN (X)	
3	MIC IN (Y)	

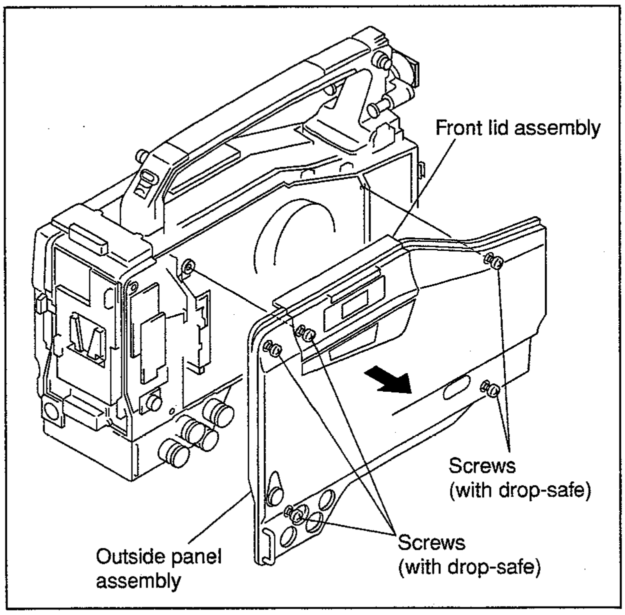
1-4. Removing and Reinstalling the Outside Panel Assembly

Removal

Note

Be sure to set the POWER switch to OFF, unplug the power cord or remove the battery before starting any of the following procedure to protect inside of the unit from damage.

1. Loosen the screw (with drop-safe) in the left of the front lid assembly.
2. Loosen the four screws (with drop-safe) and remove the outside panel assembly.


Front lid assembly
Screws
(with drop-safe)
Outside panel
assembly
Screws
(with drop-safe)

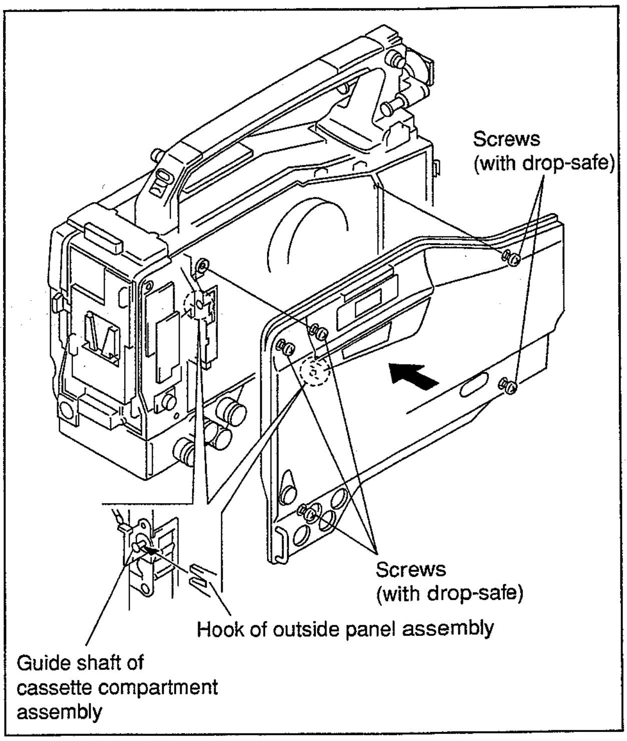
Reinstallation

1. While inserting the hook of the outside panel assembly into the guide shaft of the cassette compartment assembly, install the outside panel assembly.
2. Reinstall it by reversing the steps of disassembling.

   Note

   Standard tightening torque :

   Screw (with drop-safe, B3 × 12)
   0.8 N•m (8 kgf•cm)


Screws
(with drop-safe)
Screws
(with drop-safe)
Hook of outside panel assembly
Guide shaft of
cassette compartment
assembly

1-5. Opening and Closing the Inside Panel Assembly

Opening

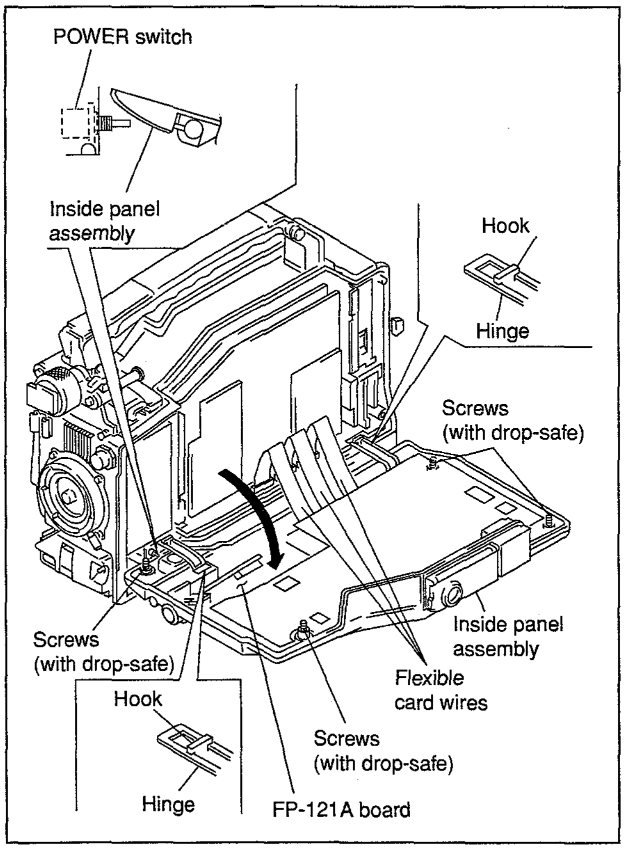
Note

Be sure to set the POWER switch to OFF, unplug the power cord or remove the battery before starting any of the following procedure to protect inside of the unit from damage.

1. Loosen the four screws (with drop-safe) and open the inside panel assembly in the direction of the arrow.

   Notes

   - The flexible card wire that is connected to the FP-121A board, will be significantly shortened of its life if it is folded. Be very careful not to fold the flexible card wire.
   - Stand the unit in the posture that the POWER switch side faces upward when the inside panel assembly is opened.


POWER switch
Inside panel assembly
Hook
Hinge
Screws (with drop-safe)
Screws (with drop-safe)
Hook
Hinge
Inside panel assembly
Flexible card wires
Screws (with drop-safe)
FP-121A board

Closing

1. Check that the hinges in the right and left are engaged securely with the hooks of the chassis.
2. Insert the inside panel assembly and tighten the four screws (with drop-safe).

   Note

   Standard tightening torque :

   Screw (with drop-safe, B3 × 12)
   0.8 N•m (8 kgf•cm)

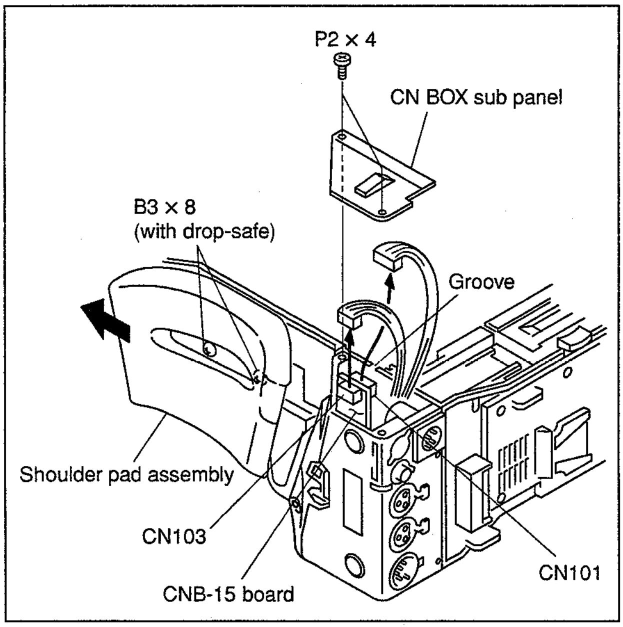
Note

Be careful not to pinch the harness between the inside panel assembly and the chassis.

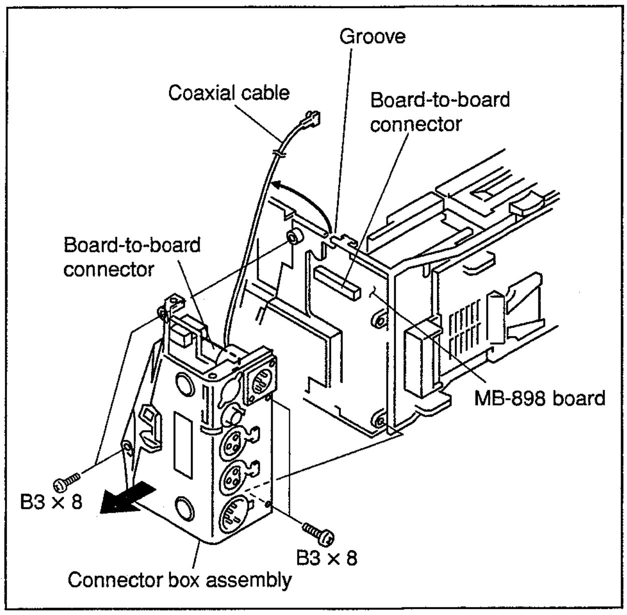
1-6. Removing and Reinstalling the Connector Box

Removal

1. Remove the outside panel assembly. (Refer to Section 1-4.)
2. Remove the inside panel assembly. (Refer to Section 1-5.)
3. Remove the DCP board assembly and the DVP board assembly. (Refer to Sections 1-7-1 and 1-7-2.)
4. Loosen the two screws (with drop-safe) and slide the shoulder pad assembly in the direction of the arrow.
5. Remove the two screws (P2 × 4) and remove the CN box sub-panel.
6. Disconnect the harness from connectors (CN101 and CN103) of the CNB-15 board.


P2 x 4
CN BOX sub panel
B3 x 8
(with drop-safe)
Groove
Shoulder pad assembly
CN103
CNB-15 board
CN101

7. Remove the four screws (B3 × 8). Loosen the board-to-board connector that is connected to the MB-898 board. While removing the connector box assembly in the direction of the arrow, remove the coaxial cable from the groove.


Groove
Coaxial cable
Board-to-board
connector
Board-to-board
connector
MB-898 board
B3 x 8
B3 x 8
Connector box assembly

8. Reinstall it by reversing the steps of disassembling.

Notes

- When attaching the CN box sub panel assembly, route the coaxial cable such that the coaxial cable passes through the groove.
- If the coaxial cable is pinched between the frame and the CN box sub panel, the coaxial cable can have open-circuit.

Note

Standard tightening torque :
P2 × 4 : 16 to 22 × 10^{-2} N•m (1.6 to 2.2 kgf•cm)
B3 × 8 : 68 to 92 × 10^{-2} N•m (6.8 to 9.2 kgf•cm)

1-7. Removing and Reinstalling the Plug-in Boards

When removing and reinstalling the plug-in boards, be very careful not to damage the parts on the printed board and also not to install them in the wrong direction or in the wrong slot.

1-7-1. DCP Board Assembly

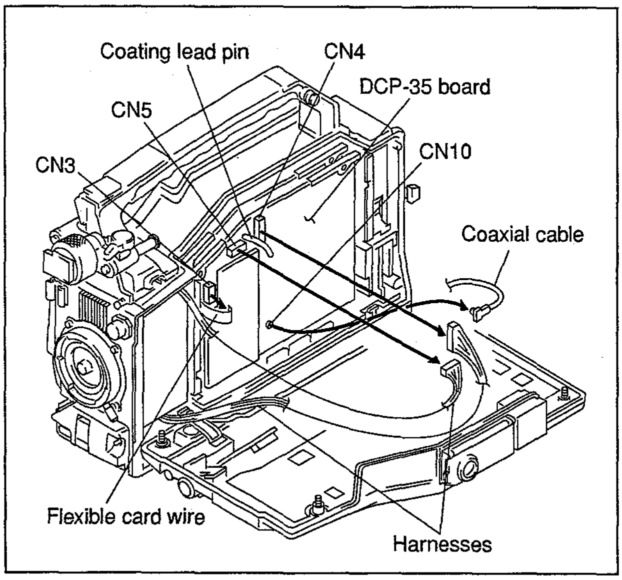
Removal

1. Open the inside panel assembly. (Refer to Section 1-5.)
2. Remove the harness form the coating lead pin, then disconnect the harnesses from the connectors (CN4, CN5) of the DCP-35 board.
3. Disconnect the flexible card wire from the connector (CN3) of the DCP-35 board.

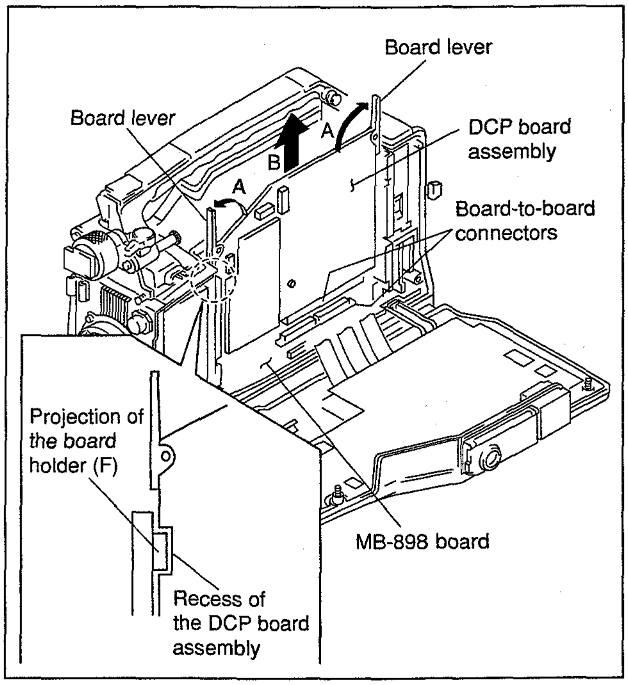
Notes

- Life of flexible card wire will be significantly shortened if it is folded. Be very careful not to fold the flexible card wire.
- If the copper plating of the base material exposes due to wear of the tin plated contact of the connector, replace it with the new flexible card wire.

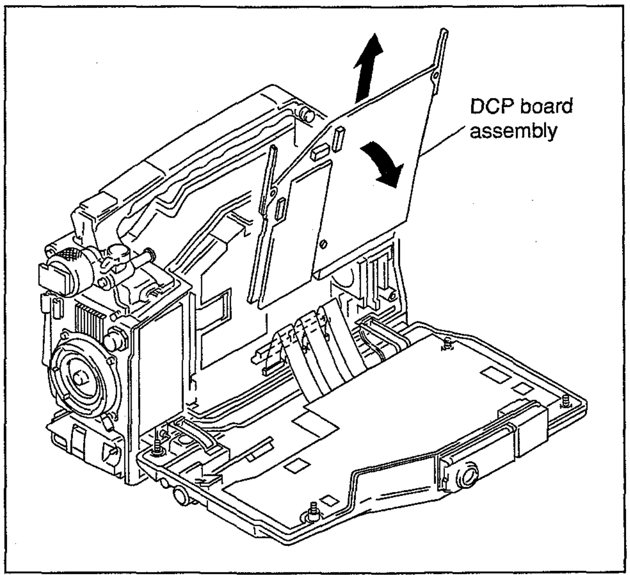
4. Disconnect the coaxial cable from the connector (CN10) of the DCP-35 board.


Coating lead pin
CN4
DCP-35 board
CN5
CN3
CN10
Coaxial cable
Flexible card wire
Harnesses

5. Open the board lever in the direction of arrow A and remove the board-to-board connector that is connected to the MB-898 board.
6. Raise the DCP board assembly in the direction of arrow B by about 15 mm and align the projection of the board holder (F) with the recess of the DCP-32 board.


Board lever
Board lever
A
B
A
DCP board assembly
Board-to-board connectors
Projection of the board holder (F)
MB-898 board
Recess of the DCP board assembly

7. Slant the DCP board assembly to the front and remove it.


DCP board assembly

Reinstallation

1. Raise the board lever to its upright position.
2. Insert the DCP board assembly in a slant angle until the projection of the PC board holder (F) meets the recess of the DCP-35 board. At the above angle, raise the DCP board assembly in the right angle and insert it.
3. When shaft of the board lever enters into the chassis, slant the board lever and push down the board from its top until it is firmly inserted to the board-to-board connector of the MB-898 board.
4. Reinstall it by reversing the steps of disassembling.

   Notes
   - When re-installing the harness that is disconnected in step 2, the CN4 harness must be hooked on the top edge of the AT-143 board.
   - When re-installing the CN5 harness, twist it by 3 turns and install it by pushing in the direction of arrow A. The CN5 harness must be installed 20 mm more far from the CN4 harness.
   - Fix the harness with the coating lead pin.

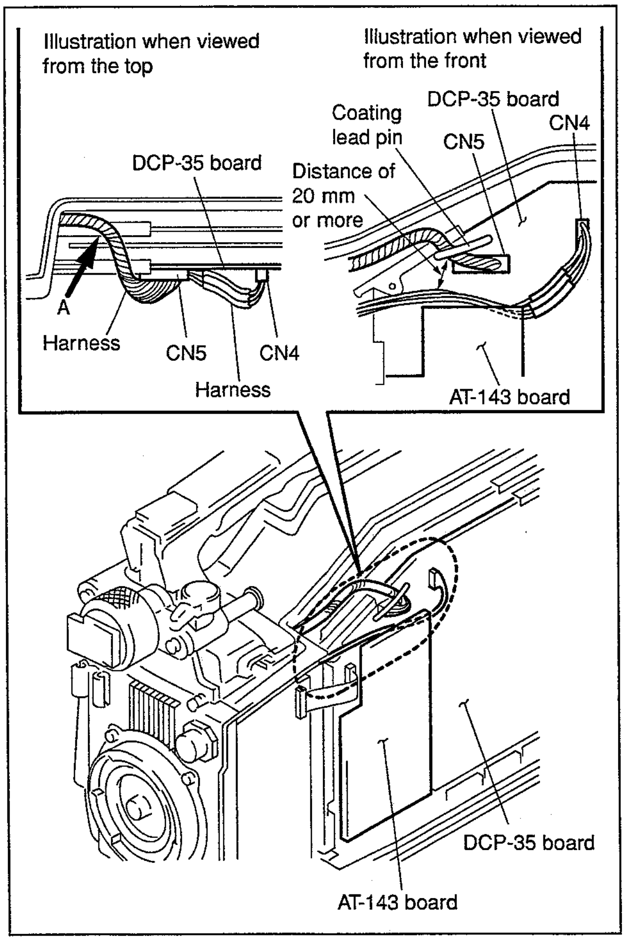


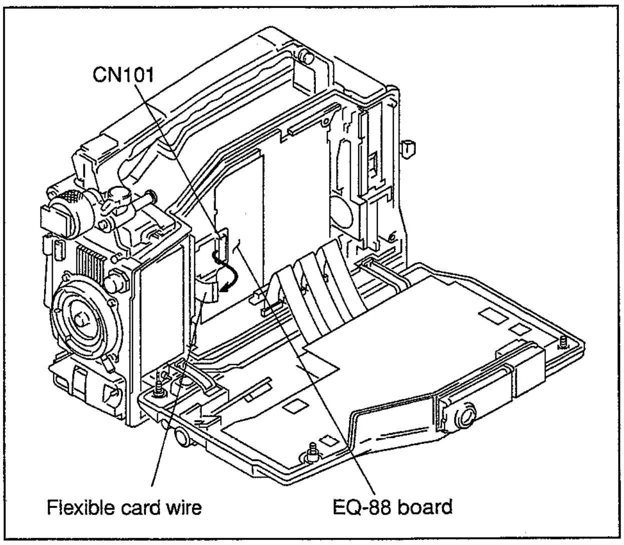
Illustration when viewed from the top
Illustration when viewed from the front
DCP-35 board
Coating lead pin
CN5
CN4
DCP-35 board
Distance of 20 mm or more
A
Harness
CN5
CN4
Harness
AT-143 board
DCP-35 board
AT-143 board

1-7-2. DVP Board Assembly

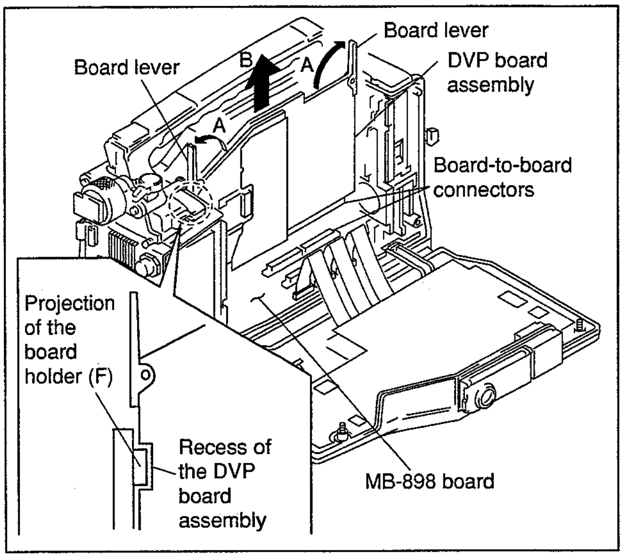
Removal

1. Open the inside panel assembly. (Refer to Section 1-5.)
2. Remove the DCP board assembly. (Refer to Section 1-7-1.)
3. Disconnect the flexible card wire from the EQ-88 board connector (CN101).

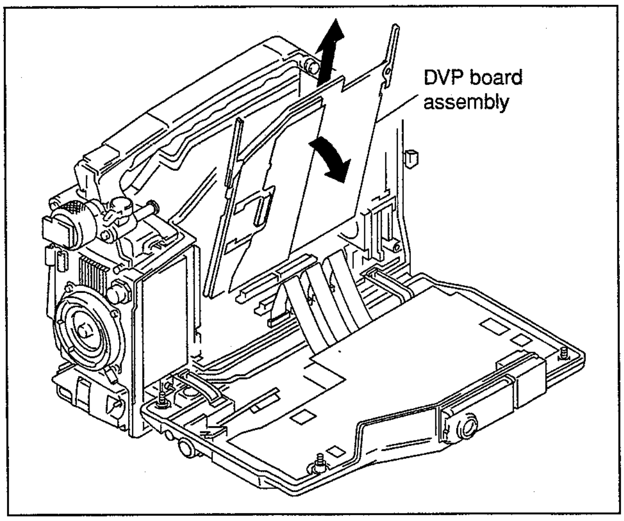
   Notes
   - Life of flexible card wire will be significantly shortened if it is folded. Be very careful not to fold the flexible card wire.
   - If the copper plating of the base material exposes due to wear of the tin plated contact of the connector, replace it with the new flexible card wire.


CN101
Flexible card wire
EQ-88 board

4. Open the board lever in the direction of arrow A and remove the board-to-board connector that is connected to the MB-898 board.
5. Raise the DVP board assembly in the direction of arrow B by about 15 mm and align the projection of the board holder (F) with the recess of the DVP-20 board.


Board lever
Board lever
B
A
DVP board assembly
A
Board-to-board connectors
Projection of the board holder (F)
Recess of the DVP board assembly
MB-898 board

6. Slant the DVP board assembly to the front and remove it.


DVP board assembly

Reinstallation

1. Raise the board lever to its upright position.
2. Insert the DVP board assembly in a slant angle until the projection of the PC board holder (F) meets the recess of the DVP-20 board. At the above angle, raise the DVP board assembly in the right angle and insert it.
3. When shaft of the board lever enters into the chassis, slant the board lever and push down the board from its top until it is firmly inserted to the board-to-board connector of the MB-898 board.
4. Reinstall it by reversing the steps of disassembling.

1-8. Removing and Reinstalling the Flexible Card Wires

This unit uses two types of flexible card wire.

Notes

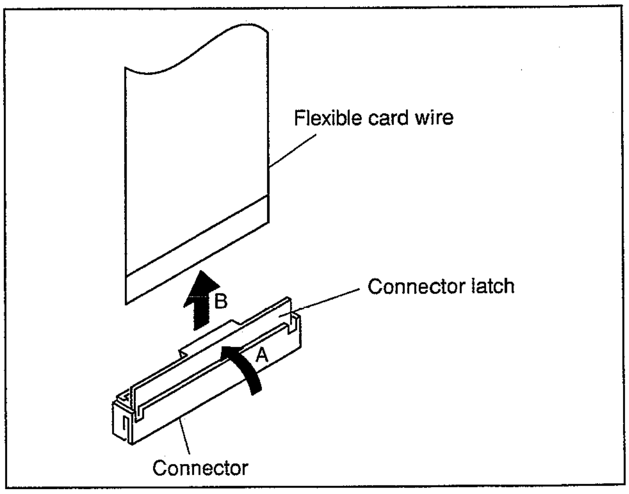
- Life of flexible card wire will be significantly shortened if it is folded. Be very careful not to fold the flexible card wire.
- When a flexible card wire is disconnected, check if it has peeling-off or scratch on the tin plated contact of the connector. If the copper plating of the base material exposes due to wear of the tin plated contact of the connector, replace it with the new flexible card wire.

Type-A

Removal

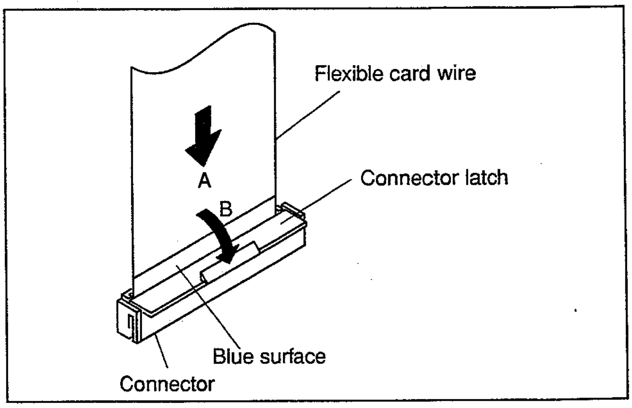
1. Open the connector latch in the direction of arrow A to release the lock.

2 Remove the flexible card wire in the direction of arrow B.


Flexible card wire
B
Connector latch
A
Connector

Reinstallation

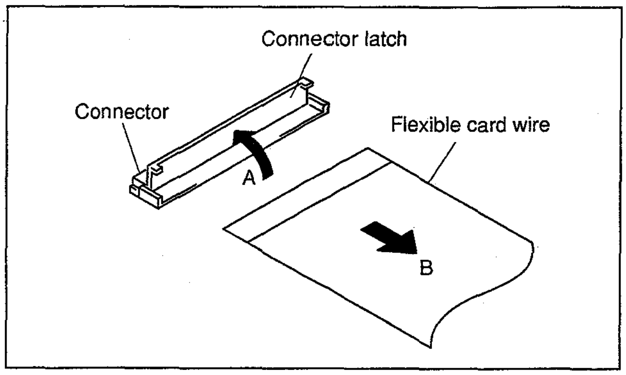
1. Hold the flexible card wire with its blue surface facing to the front, and insert it in the direction of arrow A.
2. Close the connector latch in the direction of arrow B to lock it.


Flexible card wire
A
B
Connector latch
Blue surface
Connector

Type-B

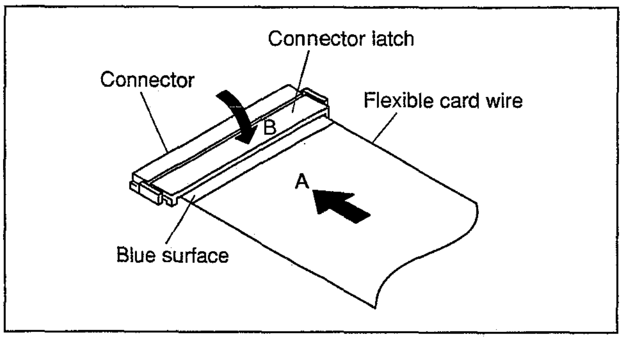
Removal

1. Open the connector latch in the direction of arrow A to release the lock.
2. Remove the flexible card wire in the direction of arrow B.


Connector latch
Connector
Flexible card wire
A
B

Reinstallation

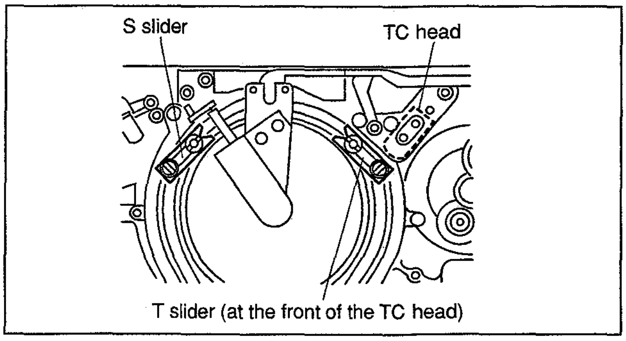
1. Hold the flexible card wire with its blue surface facing upward, and insert it in the direction of arrow A.
2. Close the connector latch in the direction of arrow B to lock it.


Connector latch
Connector
Flexible card wire
B
A
Blue surface

1-9. Removing and Reinstalling the Cassette Compartment

Notes

- Be sure to set the POWER switch to OFF, unplug the power cord or remove the battery before starting any of the following procedure to protect inside of the unit from damage.
- Only when the release plate is attached to the T-tension regulator assembly, remove and reinstall the Cassette compartment assembly at the thread position shown in the illustration below.When the TC head is at the other position, T-tension regulator assembly interferes with the cassette compartment.


S slider
TC head
T slider (at the front of the TC head)

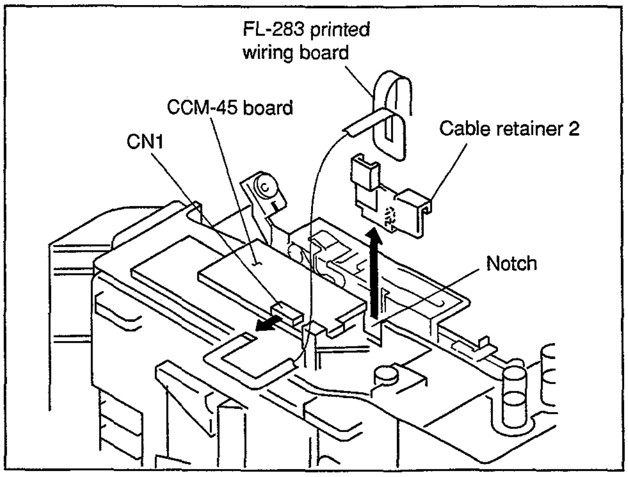
- Cassette compartment can be removed when it is raised up or when it pushed down.

Removal

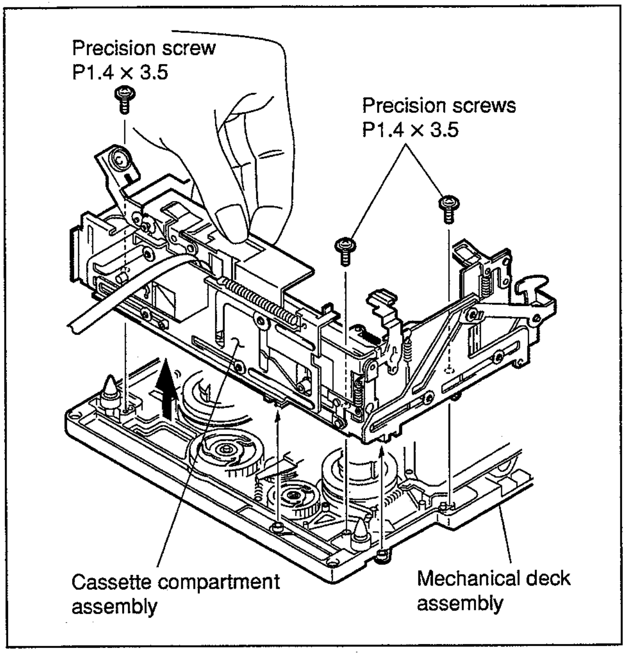
1. Remove the outside panel assembly.
   (Refer to Section 1-4.)
2. Remove the FL-283 printed wiring board from the connector (CN1) of the CCM-45 board.
3. Remove the FL-283 printed wiring board while removing the cable retainer from the notch.

   Note

   Life of the FL-283 printed wiring board will be significantly shortened if it is folded. Be very careful not to fold the FL-283 printed wiring board.

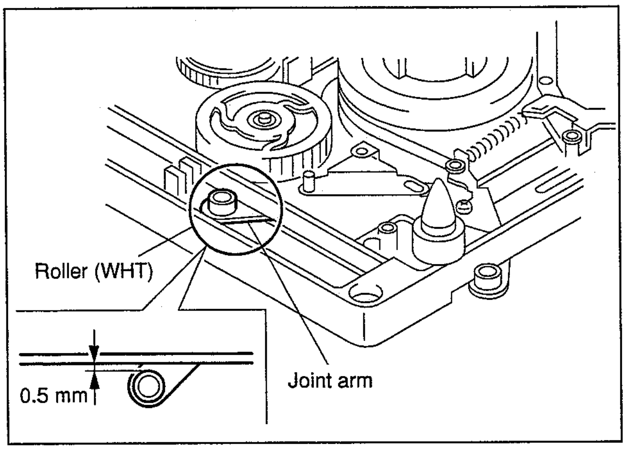

FL-283 printed wiring board
CCM-45 board
CN1
Cable retainer 2
Notch

4. Remove the three precision screws (P1.4 × 3.5) and move the cassette compartment assembly by holding the specified position as shown in the illustration and remove the cassette compartment assembly in the direction of the arrow.

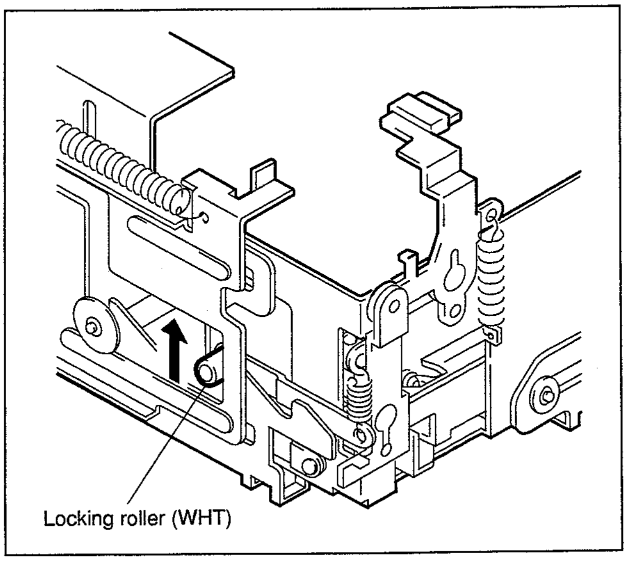

Precision screw
P1.4 × 3.5
Precision screws
P1.4 × 3.5
Cassette compartment assembly
Mechanical deck assembly

Reinstallation

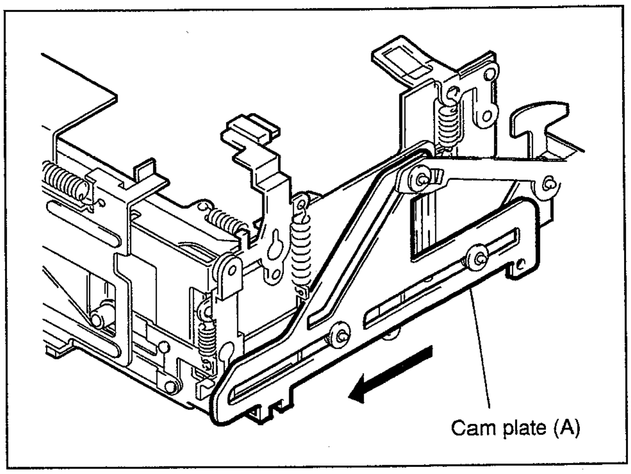
1. Adjust position of the joint arm so that the gap between the outside circumference of the white roller of the joint arm and the end surface of the mechanical deck assembly is 0.5 mm.


Roller (WHT)
0.5 mm
Joint arm

2. Raise the white locking roller of the cassette compartment assembly to set the cassette compartment assembly to its up position.


Locking roller (WHT)

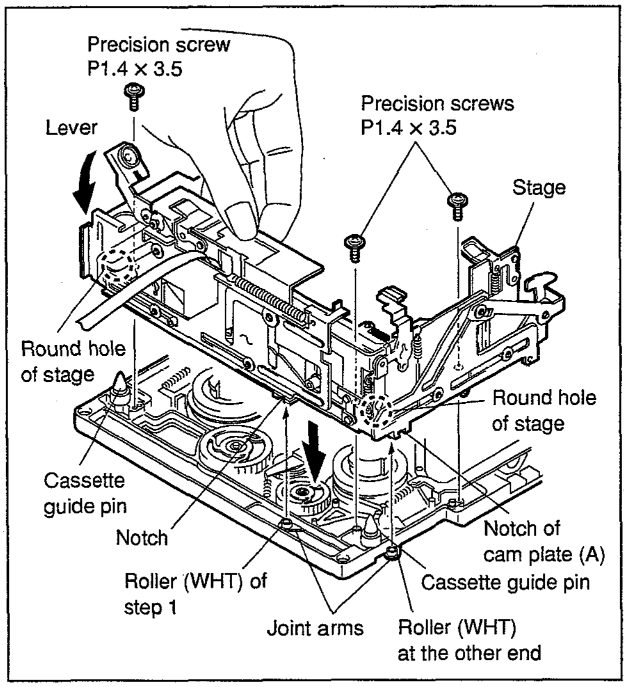
3. Slide the cam plate (A) of the right side of the cassette compartment assembly in the direction of the arrow as far as it can go.



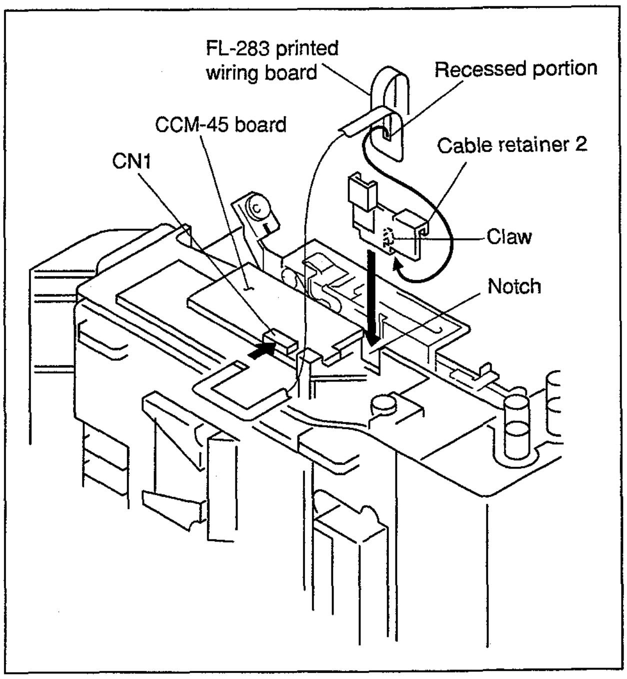
4. Hold the cassette compartment assembly at the position shown in the illustration and insert the chassis so that the two cassette guide pins enter into the round hole of the stage.
   At this moment, confirm that the white roller at the other end of the joint arm that is adjusted of its position at step 1, enters into the notch of the cam plate (A) on the right side.
5. Press the lever of the cassette compartment assembly and check to see that the stage can move up and down smoothly. If the stage does not move up and down smoothly, check above procedure starting from step 1.
6. Attach the cassette compartment assembly with three screws.

   Note

   Standard tightening torque :
   10×10^{-2} N•m (1.0 kgf•cm)


Precision screw
P1.4 x 3.5
Lever
Precision screws
P1.4 x 3.5
Stage
Round hole of stage
Round hole of stage
Cassette guide pin
Notch
Notch of cam plate (A)
Roller (WHT) of step 1
Cassette guide pin
Joint arms
Roller (WHT) at the other end

7. Engage the recess of the FL-283 printed wiring board with the two claws of the cable retainer 2, and insert the cable retainer 2 into the notch.
8. Insert the FL-283 printed wiring board into the connector (CN1) of the CCM-45 board.


FL-283 printed wiring board
Recessed portion
CCM-45 board
CN1
Cable retainer 2
Claw
Notch

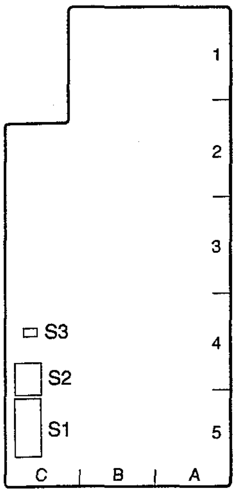
1-10. On-Board Switch/Slit land Description

For the function of the on-board switches on the APR-59 board, KY-475 board and SW-1030/1031/1038 board, refer to the Operation Manual.

Notes

- Never change the settings of the switches that are specified as "Factory-use".
- The number in parenthesis ( ) indicates the address on the circuit board.

1-10-1. AT-143 Board

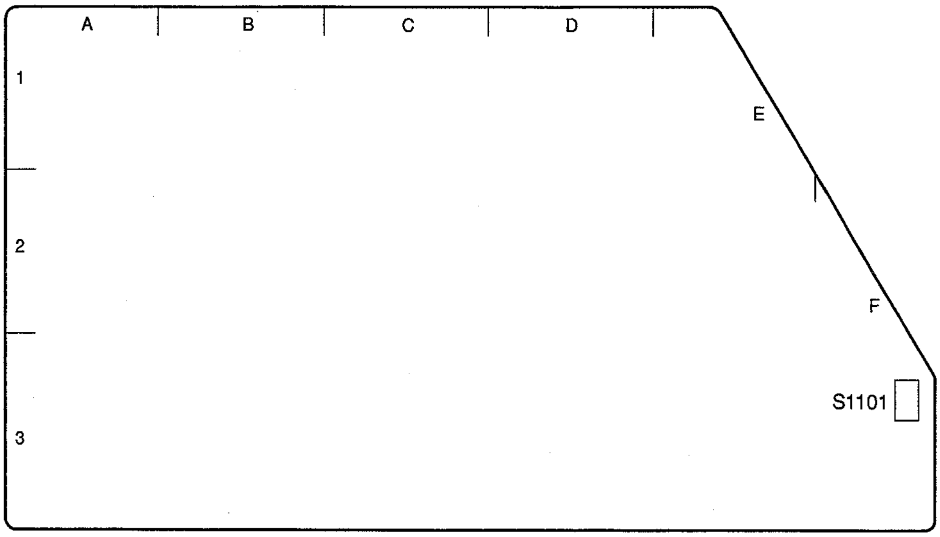


AT-143 board (B side)

Ref. No.	Address	Name	Description	Factory setting
S1-1	(C-5/B side)	SERVICE mode	Selects to display or not the SERVICE menu. ON : To display the SERVICE menu OFF : Not to display the SERVICE menu	OFF
S1-2 to 3	(C-5/B side)	–	Factory-use	OFF
S1-4	(C-5/B side)	NV-RAM reset	ON : NV-RAM (IC110)/TG-227 board reset OFF : Normal operation Be sure to set this switch to OFF during normal operation.	OFF
S1-5 to 7	(C-5/B side)	–	Factory-use	OFF
S1-8	(C-5/B side)	NV-RAM reset	ON : NV-RAM (IC10)/DCP-35 board reset OFF : Normal operation When the main power of the unit is turned on while the switch S1-8 is being set in ON, NV-RAM (IC10)/DCP-35 board is reset. Upon completion of resetting, be sure to return the switch S1-8 to OFF. **Notes** • Resetting the NV-RAM erases adjusted value of the SERVICE menu and all of the users' unique values (such as the MENU settings and the AUTOWHITE/BLACK data). • Upon completion of resetting the NV-RAM, be sure to perform the automatic black balance adjustment using the AUTO W/B BAL switch (on the front block). When the AUTO W/B BAL switch is kept pressed in the BLK position, the display changes as follows. [BLACK SET] → [BLACK BAL] → [BLACK SET]. Keep pressing the switch until the second [BLACK SET] is displayed. • After resetting, return the switch S1-8 to OFF. If not, the adjustment data is not saved in the NV-RAM hereafter.	OFF

Ref. No.	Address	Name	Description	Factory setting
S2-1 to 2	(C-4/B side)	–	Factory-use	OFF
S2-3	(C-4/B side)	NTSC/PAL	Select the signal system of the MSW-900/900P. ON : PAL OFF : NTSC **Note** • The switch S101-8/SS-92 board has the same function. NTSC/PAL system selection is set only when both of the switches are set to the same system. • When the circuit board is replaced, the new (replacement) circuit board is shipped from the factory with the default setup that is OFF. When you use the circuit board in the PAL system, be sure to set this switch to ON.	 For NTSC : OFF For PAL : ON
S2-4	(C-4/B side)	–	Factory-use	OFF
S3	(C-4/B side)	TOP MENU DISABLE	Turns ON/OFF the function to display the TOP menu. ON : Not to display the TOP menu OFF : To display the TOP menu	OFF

1-10-2. EQ-88 Board



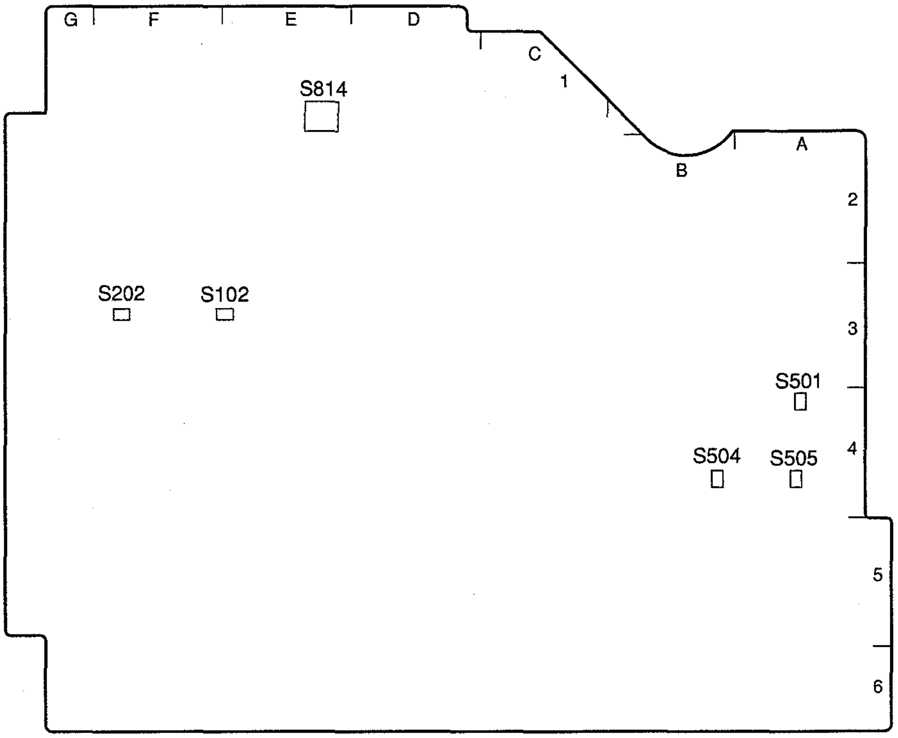
EQ-88 board (A side)

Ref. No.	Address	Name	Description	Factory setting
S1101	(F-3/A side)	–	Factory-use	OFF

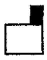
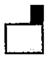
1-10-3. FP-121A Board

Note

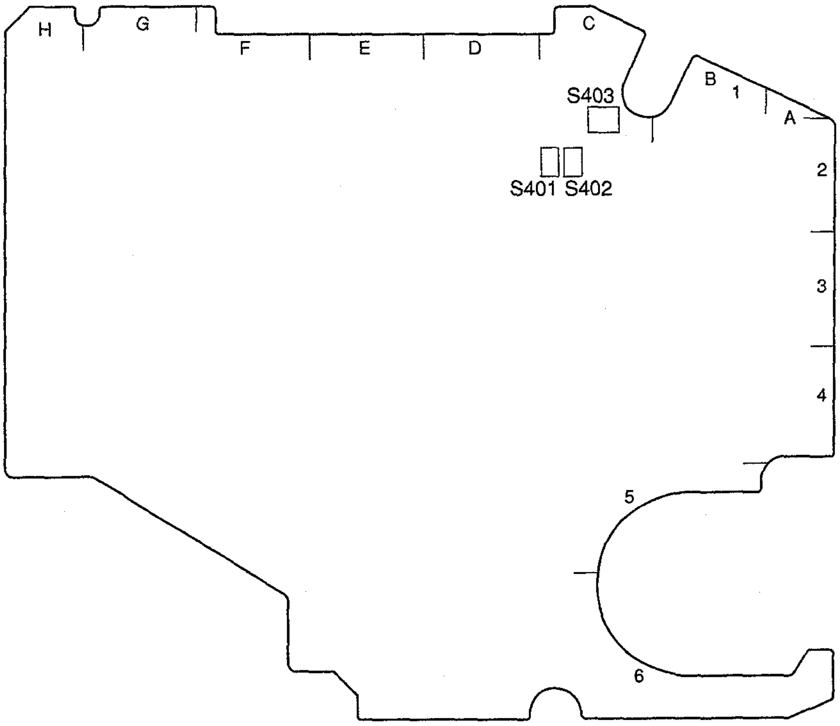
Refer to the Operation Manual for the function of the switches on A side.



FP-121A board (B side)

Ref. No.	Address	Name	Description	Factory setting
S102	(F-3/B side)	CH-1 INPUT LIMITER ON/OFF	Turns ON/OFF the limiter of the CH-1 AUDIO input stage. ON : CH-1 AUDIO input LIMITER ON OFF : CH-1 AUDIO input LIMITER OFF	OFF
S202	(F-3/B side)	CH-2 INPUT LIMITER ON/OFF	Turns ON/OFF the limiter of the CH-2 AUDIO input stage. ON : CH-2 AUDIO input LIMITER ON OFF : CH-2 AUDIO input LIMITER OFF	OFF 
S501	(A-4/B side)	AUDIO OUT XLR5P-XLR3P	Set this switch when the AUDIO OUT connector is changed to XLR3P	XLR5P 
S504	(B-4/B side)	CH-1 OUTPUT LIMITER ON/OFF	Turns ON/OFF the limiter of the CH-1 AUDIO output stage. ON : CH-1 AUDIO output LIMITER ON OFF : CH-1 AUDIO output LIMITER OFF	ON
S505	(A-4/B side)	CH-2 OUTPUT LIMITER ON/OFF	Turns ON/OFF the limiter of the CH-2 AUDIO output stage. ON : CH-2 AUDIO output LIMITER ON OFF : CH-2 AUDIO output LIMITER OFF	ON
S814-1 to 4	(E-1/B side)	–	Factory-use	OFF

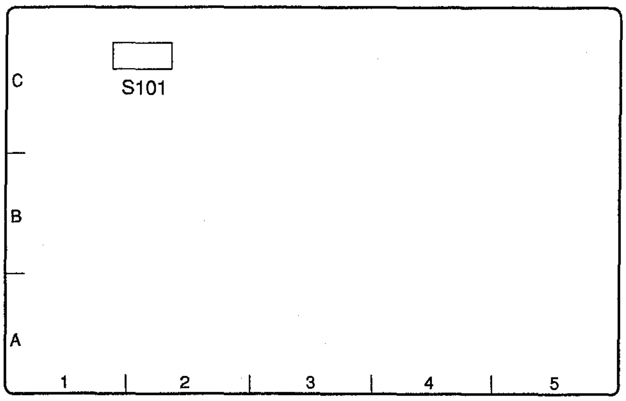
1-10-4. MDC-13A Board



MDC-13A board (B side)

Ref. No.	Address	Name	Description	Factory setting
S401	(C-2/B side)	–	Factory-use	OFF
S402	(C-2/B side)	TRACKING MODE change	Every pressing of this switch toggles the TRACKING mode. OFF: FIX (fixed) mode ON: Variable mode Tracking RV (RV401) is enabled. **Note** D404 (C-2/B side) turns on when Variable is selected.	OFF (FIX)
S403-1 to 4	(C-2/B side)	–	Factory-use	OFF

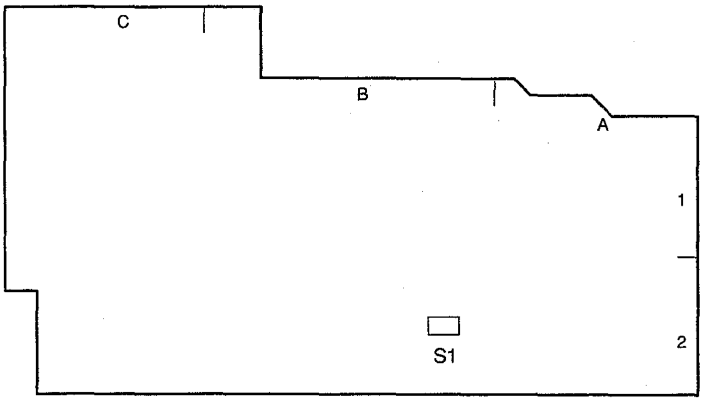
1-10-5. SS-92 Board



SS-92 board (A side)

Ref. No.	Address	Name	Description	Factory setting
S101-1, 2	(C-2/A side)	–	Not used	–
S101-3 to 6	(C-2/A side)	–	Factory-use	OFF
S101-7	(C-2/A side)	REC FORMAT IMX/HDCAM	Sets the REC FORMAT. Set this switch to the ON position in this unit. ON : IMX OFF : HDCAM	ON
S101-8	(C-2/A side)	NTSC/PAL	Selects the signal system of the MSW-900/900P main unit. ON : PAL OFF : NTSC **Note** • The switch S2-3/AT-143 board has the same function. NTSC/PAL system selection is set only when both of the switches are set to the same system. • When the circuit board is replaced, the new (replacement) circuit board is shipped from the factory with the default setup that is OFF. When you use the circuit board in the PAL system, be sure to set this switch to ON.	For NTSC : OFF For PAL : ON

1-10-6. TG-227 Board

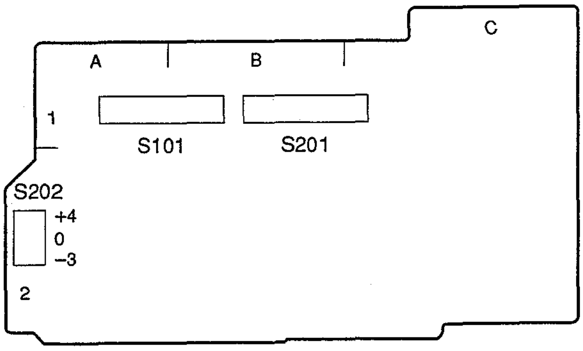


TG-227 board (B side)

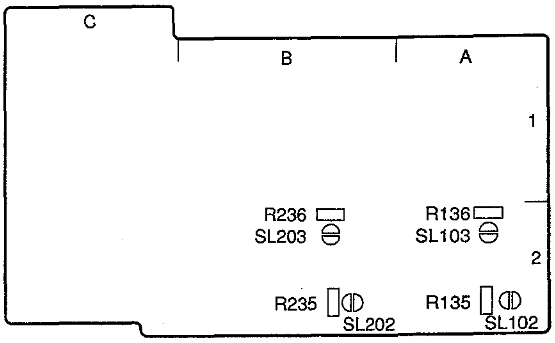
Ref. No.	Address	Name	Description	Factory setting
S1	(B-2/B side)	COM reset switch	ON : TG IC data reset OFF : Normal operation **Note** For the resetting procedure, refer to Section 1-17-1.	OFF

1-10-7. AXM-24 Board

For the details of the functions of the switch S101 and S201 on the A side, refer to the operatin manual.



AXM-24 board (A side/suffix : -14)



AXM-24 board (B side/suffix : -13, -12)

Note

The method of setting the input reference level on the AXM-24 board is different depending on the serial numbers of the units (and also on the board number suffix of the AXM-24 board) as shown below.

Setting with the use of switch: : (Board suffix -14)

Serial No. 10026 and higher
Serial No. 40436 and higher

Ref No.	Address	Name	Description	Factory setting
S202	(A-2/A side)	INPUT REFERENCE	Sets the input reference level. +4 dB : Sets theinput reference level to +4 dB. 0 dB : Sets theinput reference level to 0 dB. −3 dB : Sets theinput reference level to −3 dB.	+4 dB

Setting by using mounting or not mounting the 0 Ω register : (Board suffix -13)

Serial No.10001 through 10025
Serial No.40056 through 40435

Ref No.	Name	Input level +4 dB (Factory setting)	0 dB	−3 dB
R135	CH-1 INPUT	Mounted	Not Mounted	Not Mounted
R136	REFERENCE LEVEL	Not Mounted	Mounted	Not Mounted
R235	CH-2 INPUT	Mounted	Not Mounted	Not Mounted
R236	REFERENCE LEVEL	Not Mounted	Mounted	Not Mounted

Setting by opening or shorting the slit lands : (Board suffix -12)

Serial No. 40001 through 40055

Ref No.	Name	Input level +4 dB (Factory setting)	0 dB	−3 dB
SL102	CH-1 INPUT	SHORT	OPEN	OPEN
SL103	REFERENCE LEVEL	OPEN	SHORT	OPEN
SL202	CH-2 INPUT	SHORT	OPEN	OPEN
SL203	REFERENCE LEVEL	OPEN	SHORT	OPEN

1-11. How to Eject a Cassette Tape Manually

Note

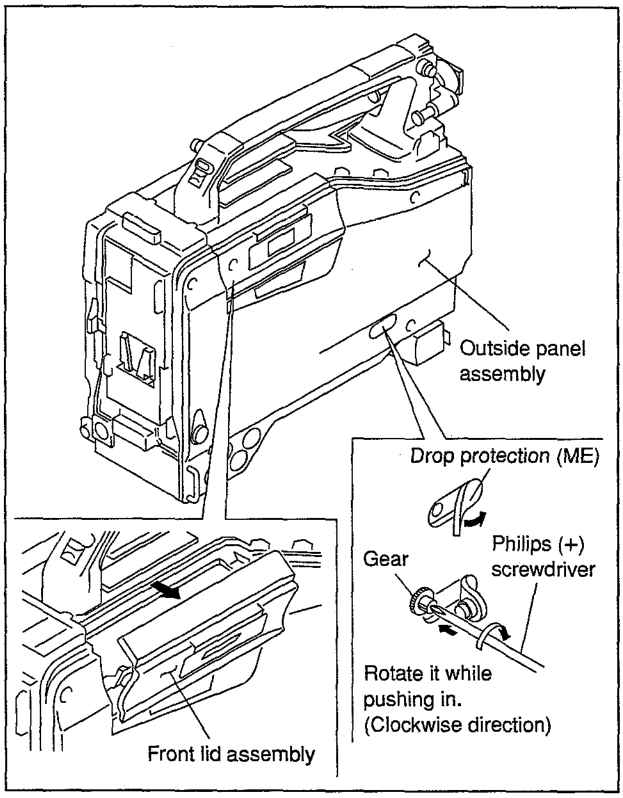
Be sure to set the POWER switch to OFF, unplug the power cord or remove the battery before starting any of the following procedure to protect inside of the unit from damage.

1. Open the drop protection (ME) of the outside panel assembly in the direction of the arrow.
2. Align tip of a philips (+) screwdriver with the gear tooth and push the gear to rotate the gear in the clockwise direction.

   Note

   When rotating the gear, check to see that a tape is wound onto the cassette reel.

3. Rotate the gear until the front lid assembly is opened. When the front lid assembly is opened, take out a cassette tape.



Notes

- When the front lid assembly is opened, never rotate the gear.
- How to close the front lid assembly
  The front lid assembly cannot be closed and locked if the gear is completely rotated opening the front lid assembly. Close the front lid assembly either by rotating the gear by 2 or 3 turns in the counter-clockwise direction while pushing in the gear, or by turning off the main power and then back on.

If the Front Lid Assembly cannot be Opened even though the Gear is Rotated

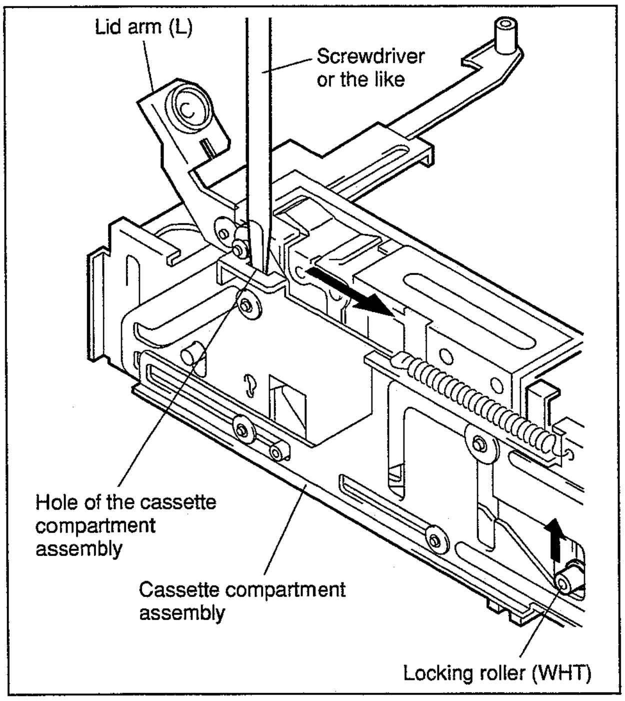
1. Remove the outside panel assembly.
   (Refer to Section 1-4.)
2. While raising up the cassette lid of a cassette tape, move up the cassette compartment assembly.
   (Refer to Section 1-9.)
3. Take out a cassette tape with care not to damage a tape inside.

1-12. How to Insert a Cassette Tape While the Outside Panel Assembly is being Removed

Note

Do not use nor press the lid arm (L) when the cassette compartment assembly is moving down to the DOWN position in step 4 below.
If the lid arm (L) is pressed, the lid arm (L) may be deformed. If the lid arm (L) is deformed, the front cover may not be locked any more after the outside panel assembly is reinstalled.

1. Remove the outside panel assembly. (Refer to Section 1-4.)
2. Move the cassette compartment assembly to the UP position. (Refer to Section 1-9.)
   - When the main power is turned on : Press the EJECT button.
   - When the main power is turned off : Raise the locking roller (WHT) in the direction of the arrow.
3. Insert a cassette tape to the cassette compartment assembly.
4. Insert a screwdriver tip or the like into the hole of the cassette compartment assembly as shown and move the cassette compartment assembly in the direction of the arrow until the cassette compartment assembly is locked. Doing this, the cassette compartment assembly moves to the DOWN position.


Lid arm (L)
Screwdriver or the like
Hole of the cassette compartment assembly
Cassette compartment assembly
Locking roller (WHT)

1-13. How to Clean the Heads When the Heads are Clogged

When the heads are clogged, clean them by the following steps below using a cleaning tape.
If head clogging cannot be cleaning even though the following "How to Use the Cleaning Tape" is implemented, clean the heads by referring to "2-1. Cleaning".

How to Use the Cleaning Tape

Required tool
- Cleaning tape BCT-HD12CL

Note

Be sure to use the cleaning tape that is specified above.
If any cleaning tape other than the specified one is used, it can result in abnormal abrasion or fatal damage of video heads.

1. Insert the cleaning tape BCT-HD12CL in the unit.
2. Head cleaning starts automatically. After about five seconds of tape running, the cleaning tape is ejected.
3. Confirm that the head clogging is removed.
   If the heads remain clogged even after the above step 2 is implemented, clean the heads with the cleaning cloth.
   (Refer to "2-1-2. Cleaning the Upper Drum Tape Running Surface and Video Heads.")

1-14. Tools and Measuring Equipment

1-14-1. Tools

Fig. No.	Part No.	Description	Used for
①	A-8327-706-A	DCP-DVP extension	Extending the DCP board assembly/DVP board assembly/extending the EQ-88 board
①-A	1-783-253-11	Coaxial cable assembly	(Refer to Sections 1-15-2, 1-15-3, 1-15-4, 1-15-5 and 1-15-6.)
①-B	1-757-490-11	Flexible card wire (30 core, 250 mm)	Extending the CCD unit etc. (Refer to Section 1-15-8.)
①-C	1-757-491-11	Flexible card wire (45 core, 250 mm)	Extending the SS-92 board/extending the machanical deck assembly etc. (Refer to Sections 1-15-7 and 1-15-9.) **Note** The four flexible card wires of this type are required to extend the SS-92 board. The six flexible card wires of this type are required to extend the machanical deck assembly.
②	A-8327-636-A	100P-EXT assembly	Extending the EQ-88 board (Refer to Section 1-15-6.)
③	A-8327-457-A	EX-764 board	Extending the machanical deck assembly (Refer to Section 1-15-9.) **Note** The three EX-764 boards are required to extend the machanical deck assembly.
④	A-8327-708-A	AT-DC extension assembly	Extending the AT-143
④-A	1-783-282-14	Flexible card wire (50 core)	(Refer to Section 1-15-1.)
⑤	A-8327-707-A	DR extension assembly	Extending the DCP board assembly/CCD unit (Refer to Sections 1-15-3 and 1-15-8.)
⑥	A-8327-637-A	SS-EXT assembly	Extending the SS-92 board (Refer to Section 1-15-7.)
⑦	A-8327-453-A	EX-784 board	Extending the DCP board assembly/DVP board assembly (Refer to Sections 1-15-3 and 1-15-5.)
⑧	A-8327-454-A	EX-785 board	Extending the DVP board assembly (Refer to Section 1-15-5.)

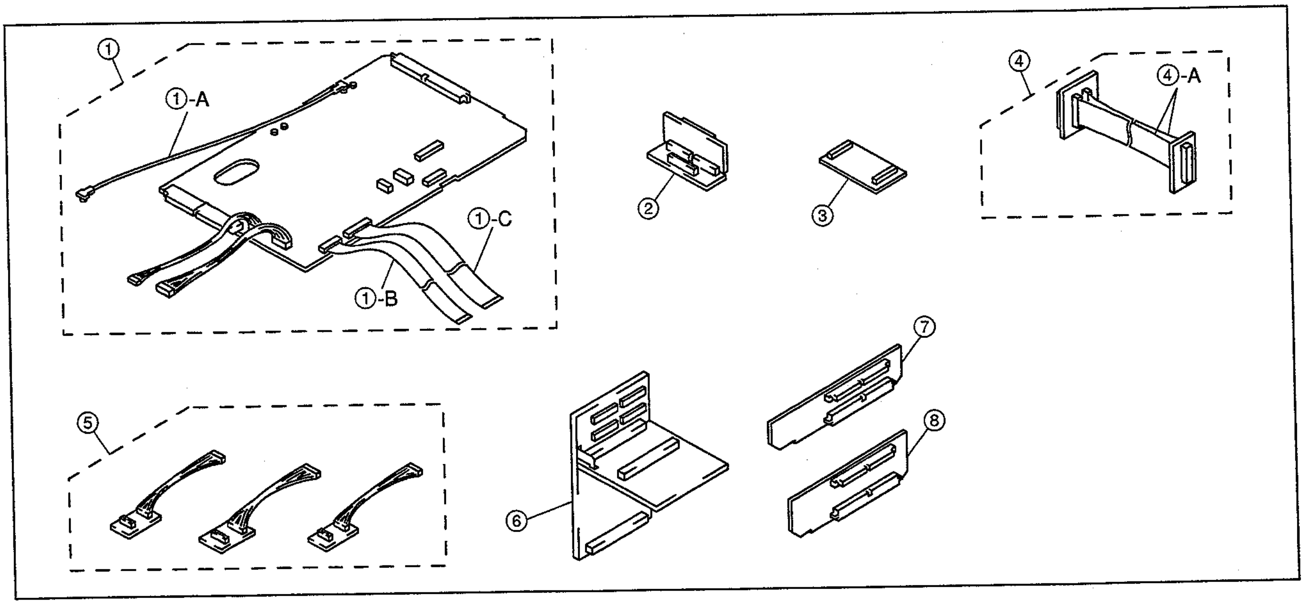
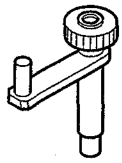


Fig. No.	Part No.	Description	Used for
⑨	J-6001-820-A	Drum eccentricity adjustment (3)	Upper drum eccentricity adjustment
⑩	J-6001-830-A	Drum eccentricity adjustment (2)	
⑪	J-6325-530-A	Drum eccentricity adjustment (6)	
⑫	J-6026-110-A	Multi burst chart	Camera adjustment
	J-6026-130-B	Gray-scale chart (transparent type) (4: 3)	
	Commercially available on market	Gray-scale chart (reflective type) (4: 3)	
	J-6394-080-A	Gray-scale chart (transparent type) (16: 9)	
⑬	J-6029-140-B	Pattern box PTB-500	
⑭	J-6035-070-A	IC extraction tool (CT-2101)	Removing the PLCC IC
⑮	J-6080-840-A	Mirror (small oval type)	Video tracking adjustment
⑯	J-6152-450-A	Wire clearance check gauge	Clearance check
⑰	J-6322-420-B	Tape guide adjustment screwdriver (45)	Tape path adjustment
	J-6322-420-3	Tool, 0.89 bit (45)	
⑱	J-6323-530-A	Stop washer fastening tool	Stop washer installation
⑲	J-6323-890-A	Torque cassette (FWD back tension)	FWD back tension adjustment
⑳	J-6324-150-A	Reel table height gauge	Reel table height adjustment
㉑	J-7032-610-C	Cassette reference plate	

⑨



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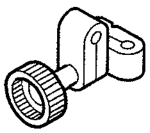

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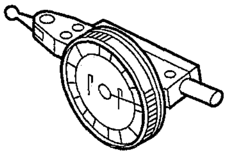

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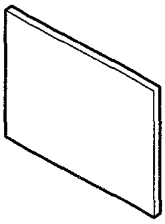

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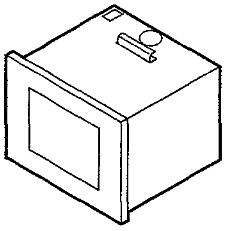

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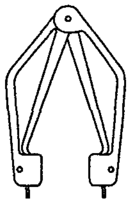

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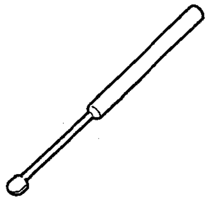

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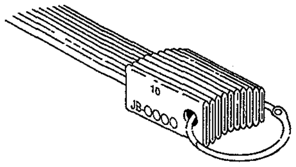

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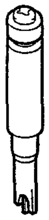

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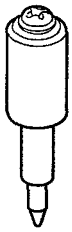

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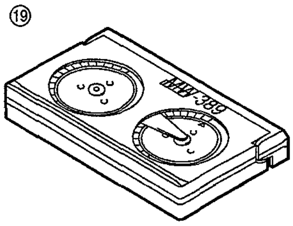

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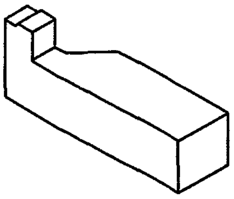

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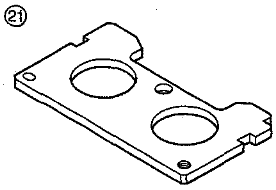
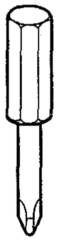


Fig. No.	Part No.	Description	Used for
㉒	J-6325-110-A	Torque screwdriver bit (for M1.4)	Fastening screw
	J-6325-380-A	Torque screwdriver bit (for M2)	
㉓	J-6326-120-A	Hexagon bit (for torque screwdriver) (for across 1.5)	
㉔	J-6325-400-A	Torque screwdriver (For 3 kg)	
㉕	J-6325-360-B	Flatness check tool	Upper drum assembly replacement
㉖	J-6531-110-A	Drum install plate DJH-27A	
㉗	A-8315-553-B	HN-255 assembly	Video tracking adjustment
㉘	3-184-527-01	Cleaning cloth	Cleaning
㉙	7-432-950-03	Sealant TSE-392W	Adhesive sealing agent to prevent water drop
㉚	7-661-018-18	Diamond oil NT-68 (Mitsubishi diamond oil hydro-fluid) (50 ml)	Lubricant
㉛	7-651-000-10	Sony (SGL-601) 50 g grease	
	7-651-000-11	Sony (SGL-801) 50 g grease	
㉜	7-700-736-05	L-shaped HEX (1.5 mm) wrench	Removing screw
	7-700-736-06	L-shaped HEX (0.89 mm) wrench	
㉝	8-960-077-01	Alignment tape, MR5-1 (for NTSC)	Audio/video adjustment
	8-960-077-51	Alignment tape, MR5-1P (for PAL)	Audio/video adjustment
	8-960-077-61	Alignment tape, MR2-1P	Video tracking adjustment

㉒



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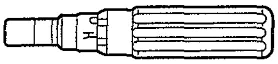

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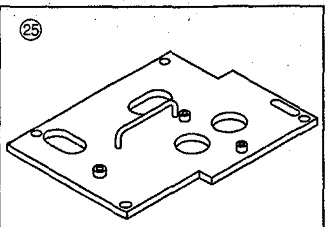

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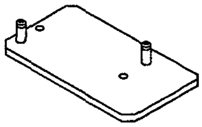

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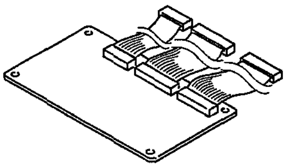

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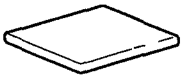

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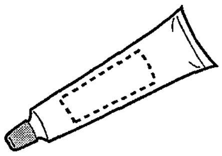

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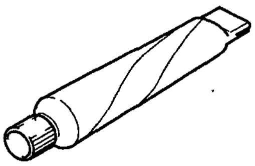

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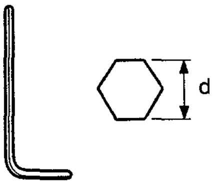

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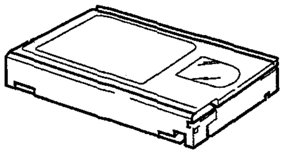
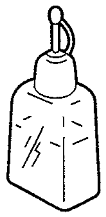


Fig. No.	Part No.	Description	Used for
㉞	9-919-573-01	Cleaning fluid	TTP cleaning
㉟	J-6531-100-A	Sensor MCB (DF-110) tool assembly	Photo sensor replacement
㊱	A-8326-017-A	ROM-28 board	AT-143 board ROM version upgrading
㊲	7-700-751-01	NUT DRIVER (4.5 × 76 MM)	
㊳	J-6531-270-A	S3 guide height check tool	S3 guide adjustment
㊴	3-703-358-04	Parallel pin (d = 2.0 mm)	Gear chain phase adjustment
㊵	J-6531-280-A	FL-272 board	For the Software download
㊶	J-6531-320-A	SYSCON/SERVO ROM	For the Software download
—	7-432-114-11	Screw locking compound	
—	Commercially available on market	Blank tape, BCT-60MX	For recording
		Cleaning tape, BCT-HD12CL	Head cleaning
		Memory label made by Sony, MLB-1M-100	Adjustment after replacement of the CCM-45 board
		Memory stick	Saving the camera setup data

㉞



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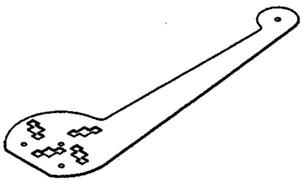

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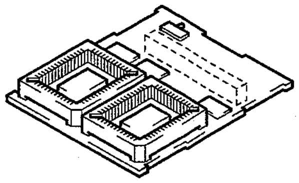

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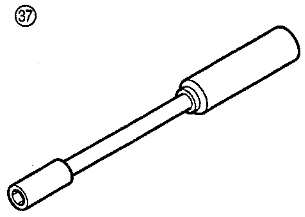

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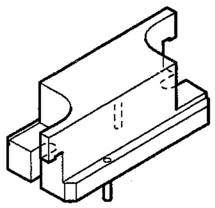

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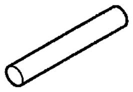

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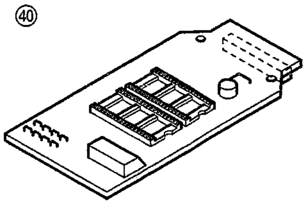

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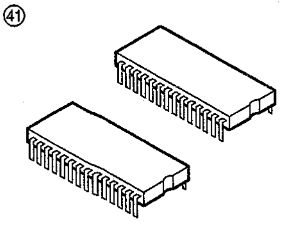


1-14-2. Measuring Equipment

Use the calibrated equipment or equivalent as listed below for the adjustments.

Required equipment	Model name
Oscilloscope	Tektronix 2465/TDS460A/TDS3054
Waveform/vector monitor	Tektronix 1780R/1781R
Frequency counter	Advantest TR5821AK
Digital VOM	Advantest TR6845
Color monitor	Sony BVM-1410/BVM-2051
Black and white monitor	Sony BVM-D20F1J
Audio analyzer	Tektronix AA501A (OP.2)
Signal generator	Tektronix SG-5010/TG-2000
Measuring equipment	Tektronix VM-700A

1-14-3. Alignment Tape

Describes the alignment tapes used for adjusting the unit.

1. MR5-1 (SONY part No. 8-960-077-01) : For 525/60 MPEG IMX system
MR5-1P (SONY part No. 8-960-077-51) : For 625/50 MPEG IMX system

Used for video/audio adjustment.

Time (min. : sec.)	Digital video	Digital audio	CTL track
0:00 -	100 % color-bar	1 kHz sine wave, −20 dB FS	CTL
2:00 -	100 % color-bar	1 kHz sine wave, 0 dB FS	CTL
4:00 -	100 % color-bar	−∞ dB FS	CTL
6:00 -	100 % color-bar	20 Hz sine wave, −20 dB FS	CTL
8:00 -	100 % color-bar	20 kHz sine wave, −20 dB FS	CTL
10:00 -	Ramp	1 kHz sine wave, −20 dB FS	CTL
12:00 -	Ramp	1 kHz sine wave, 0 dB FS	CTL
14:00 -	Ramp	−∞ dB FS	CTL
16:00 -	Ramp	20 Hz sine wave, −20 dB FS	CTL
18:00 -	Ramp	20 kHz sine wave, −20 dB FS	CTL
20:00 -	100 % color-bar	1 kHz sine wave, −20 dB FS	CTL
22:00 -	100 % color-bar	1 kHz sine wave, 0 dB FS	CTL
24:00 -	100 % color-bar	−∞ dB FS	CTL
26:00 -	100 % color-bar	20 Hz sine wave, −20 dB FS	CTL
28:00 - 30:00	100 % color-bar	20 kHz sine wave, −20 dB FS	CTL

2. MR2-1P (SONY part No. 8-960-077-61) : For MPEG IMX

Used for servo adjustment. (This alignment tape can be used both 525/60 and 625/50 systems.)

Time (min. : sec.)	Digital video/Digital audio	CTL track
00:00 - (Pulse*)	8T (2.9 MHz) (A/C CH)	CTL
15:00 -	8T (2.9 MHz) (B/D CH)	CTL
20:00 - 25:00	2T (11.4 MHz) (All CH)	CTL

*: The time code data is not recorded on the time code track during pulse portion (00:00 to 15:00). This portion is recorded the duty 7:3 pulse on the CTL track. Therefore, when playing back this portion, time data which is interpolated by the time code signal is displayed.

1-15. How to Extend the Circuit Board

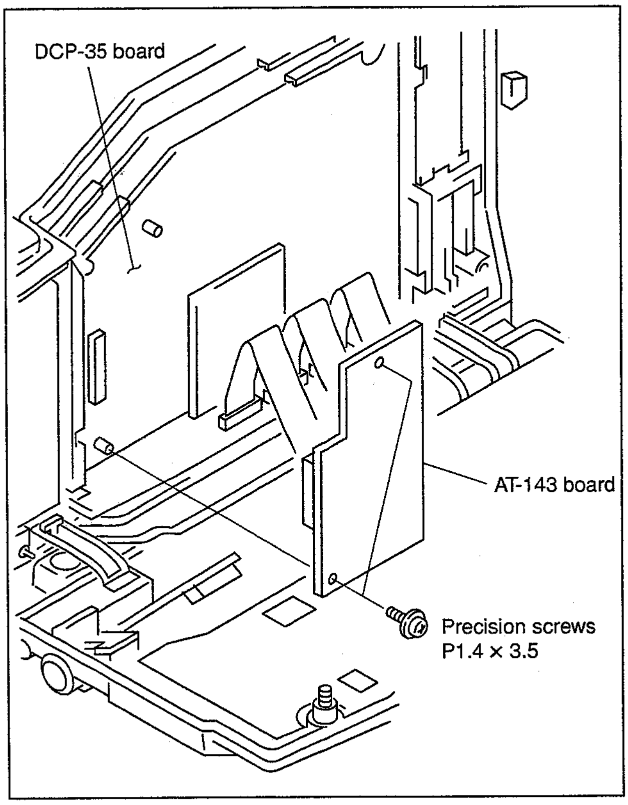
1-15-1. Extending the AT-143 Board

Required tool : AT-DC extension assembly

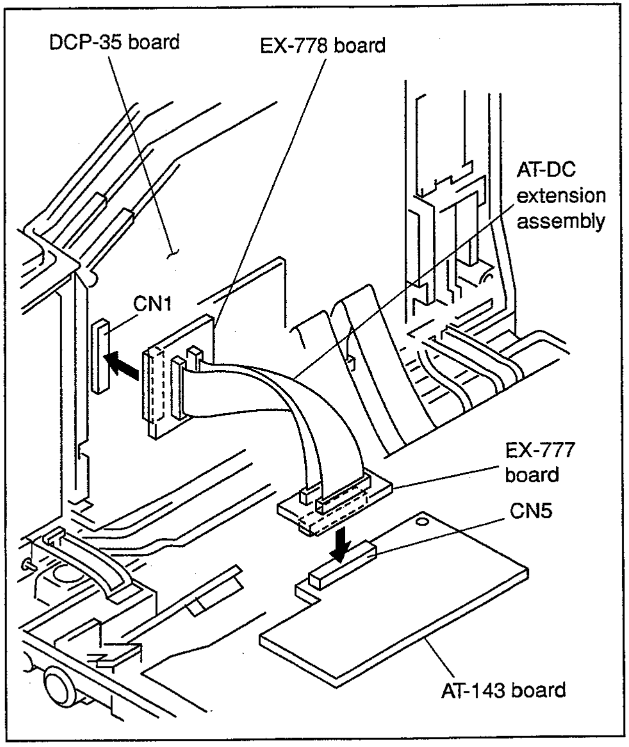
Note

Life of flexible card wire will be significantly shortened if it is folded. Be very careful not to fold the flexible card wire.

1. Open the inside panel assembly. (Refer to Section 1-5.)
2. Remove the two precision screws and remove the AT-143 board.


DCP-35 board
AT-143 board
Precision screws
P1.4 x 3.5

3. Connect the AT-DC extension assembly (EX-778 board side) to the connector (CN1) of the DCP-35 board.
4. Connect the AT-DC extension assembly (EX-777 board side) to the connector (CN5) of the AT-143 board.


DCP-35 board
EX-778 board
AT-DC
extension
assembly
CN1
EX-777
board
CN5
AT-143 board

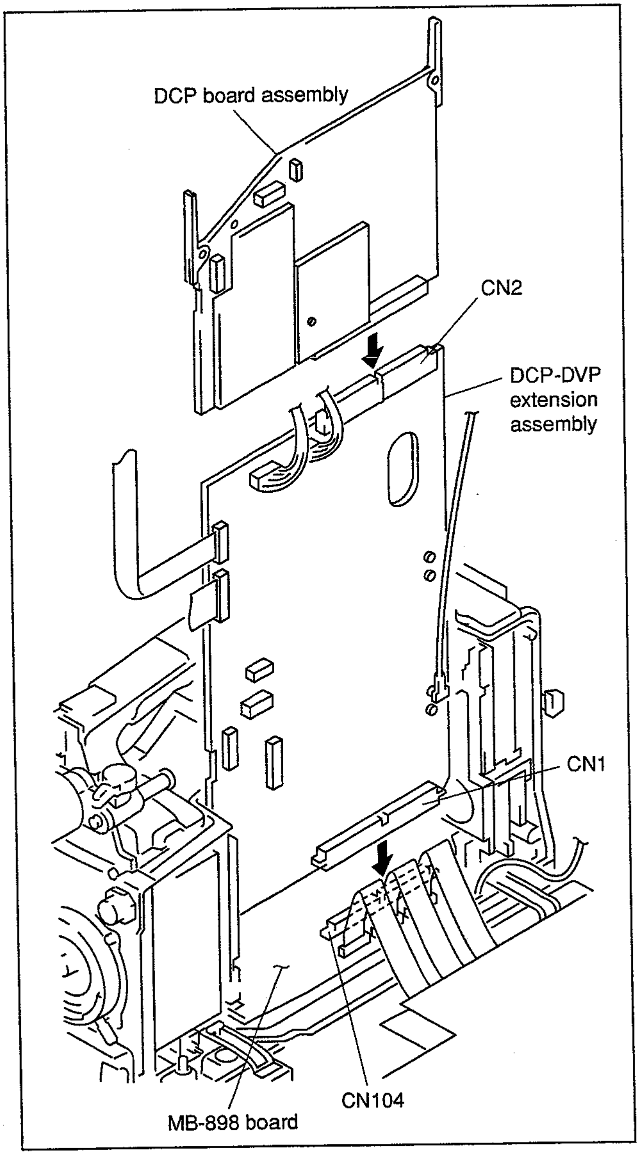
1-15-2. Extending the DCP Board Assembly

Required tool : DCP-DVP extension assembly

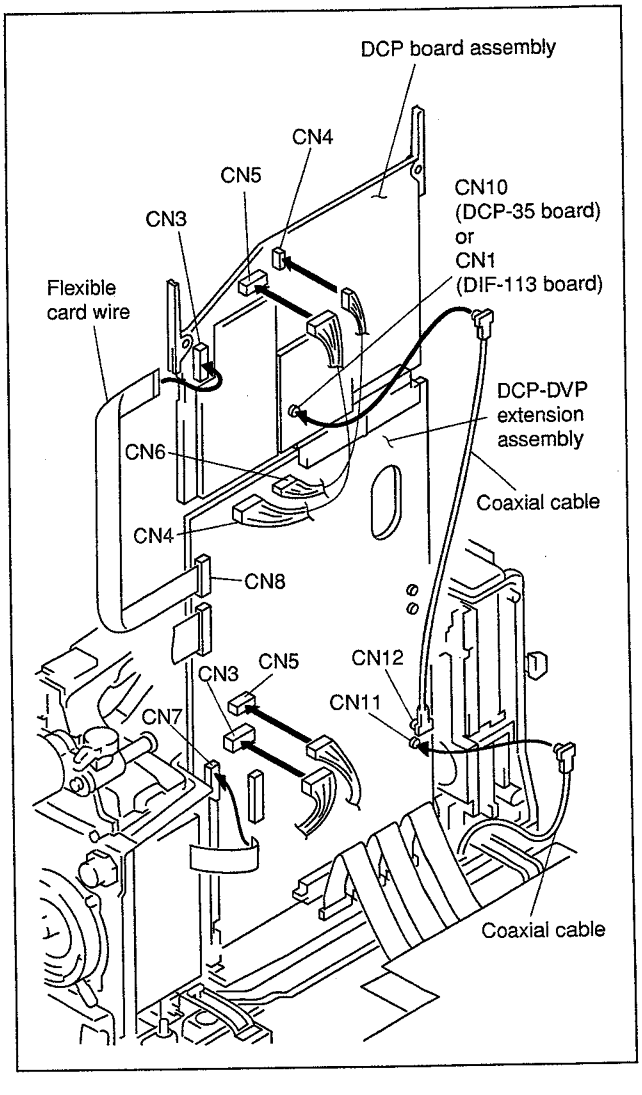
Notes

- Life of flexible card wire will be significantly shortened if it is folded. Be very careful not to fold the flexible card wire.
- Do not bend the coaxial cable strongly or do not damage the coaxial cable by hooking on the frame.

1. Open the inside panel assembly. (Refer to Section 1-5.)
2. Remove the DCP board assembly. (Refer to Section 1-7-1.)
3. Connect the connector (CN1) of the DCP-DVP extension assembly to the connector (CN104) of the MB-898 board.
4. Connect the removed DCP board assembly to the connector (CN2) of the DCP-DVP extension assembly.


DCP board assembly
CN2
DCP-DVP extension assembly
CN1
CN104
MB-898 board

5. Connect the harness, coaxial cable, flexible card wire that are removed from the connectors (CN3, CN4, CN5, CN10) in step 2, to the connectors (CN3, CN5, CN7, CN11) of the DCP-DVP extension assembly.
6. Connect the harness and the flexible card wire of the DCP-DVP extension assembly to the connectors (CN3, CN4, CN5) of the DCP board assembly..
7. Using the cable supplied with the DCP-DVP extension assembly, connect CN12 of the of the DCP-DVP extension assembly to CN10 of the DCP-35 board. When the MSDW-902 (DIF-113 board) is installed, connect it to CN1 of the DIF-113 board.


DCP board assembly
CN4
CN5
CN3
CN10 (DCP-35 board) or CN1 (DIF-113 board)
Flexible card wire
DCP-DVP extension assembly
CN6
Coaxial cable
CN4
CN8
CN3
CN5
CN12
CN11
CN7
Coaxial cable

1-15-3. Extending the DCP Board Assembly (When checking the B side and a part of the A side of the DVP board assembly)

Required tools : EX-784 board, Flexible card wire (30 core, 250 mm) (DCP-DVP extension assembly), EX-776 board (DR extension assembly)

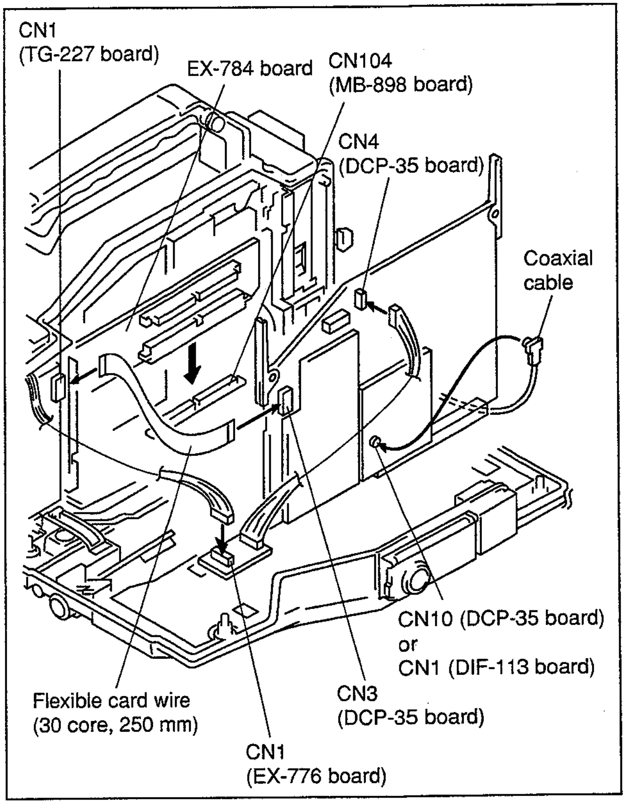
Notes

- Life of flexible card wire will be significantly shortened if it is folded. Be very careful not to fold the flexible card wire.
- Do not bend the coaxial cable strongly or do not damage the coaxial cable by hooking on the frame.

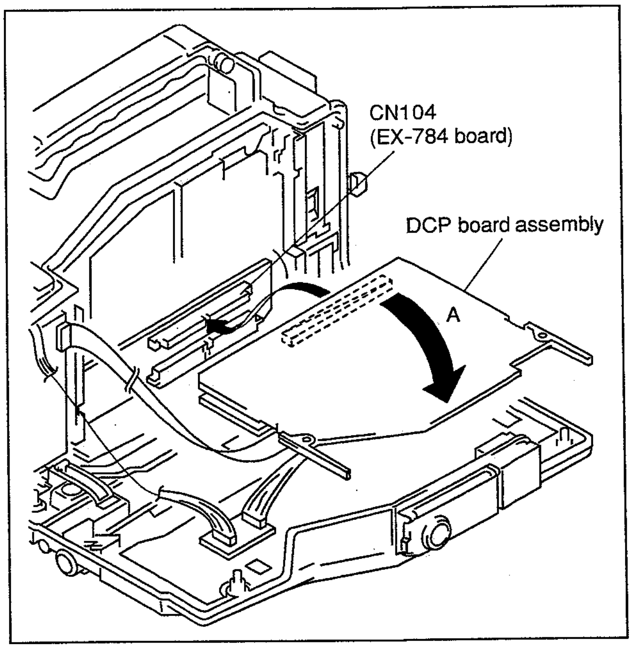
1. Open the inside panel assembly. (Refer to Section 1-5.)
2. Remove the DCP board assembly. (Refer to Section 1-7-1.)
3. Connect the EX-784 board to the connector (CN104) of the MB-898 board.
4. Disconnect the flexible card wire from the connector (CN1) of the TG-227 board. Connect the optional flexible card wire (30 core, 250 mm) instead of the removed flexible card wire.
5. Connect the other end of the optional flexible card wire (30 core, 250 mm) to the connector (CN3) of the DCP-35 board.
6. Connect a coaxial cable to CN10 of the DCP-35 board. Alternately, when the MSDW-902 (DIF-113 board) is installed, connect it to CN1 of the DIF-113 board.
7. Connect the harness that is removed form the connector (CN4) of the DCP-35 board, to the connector (CN1) of the EX-776 board. Connect the harness of the EX-776 board to the connector (CN4) of the DCP-35 board.

Note

The connector (CN5) of the DCP-28 board can be left with the harness unconnected. Leaving the connector unconnected creates no problem.


CN1
(TG-227 board)
EX-784 board
CN104
(MB-898 board)
CN4
(DCP-35 board)
Coaxial cable
CN10 (DCP-35 board)
or
CN1 (DIF-113 board)
Flexible card wire
(30 core, 250 mm)
CN3
(DCP-35 board)
CN1
(EX-776 board)

8. Slant the DCP board assembly in the direction of arrow A and connect it to the connector (CN104) of the EX-784 board.


CN104
(EX-784 board)
DCP board assembly
A

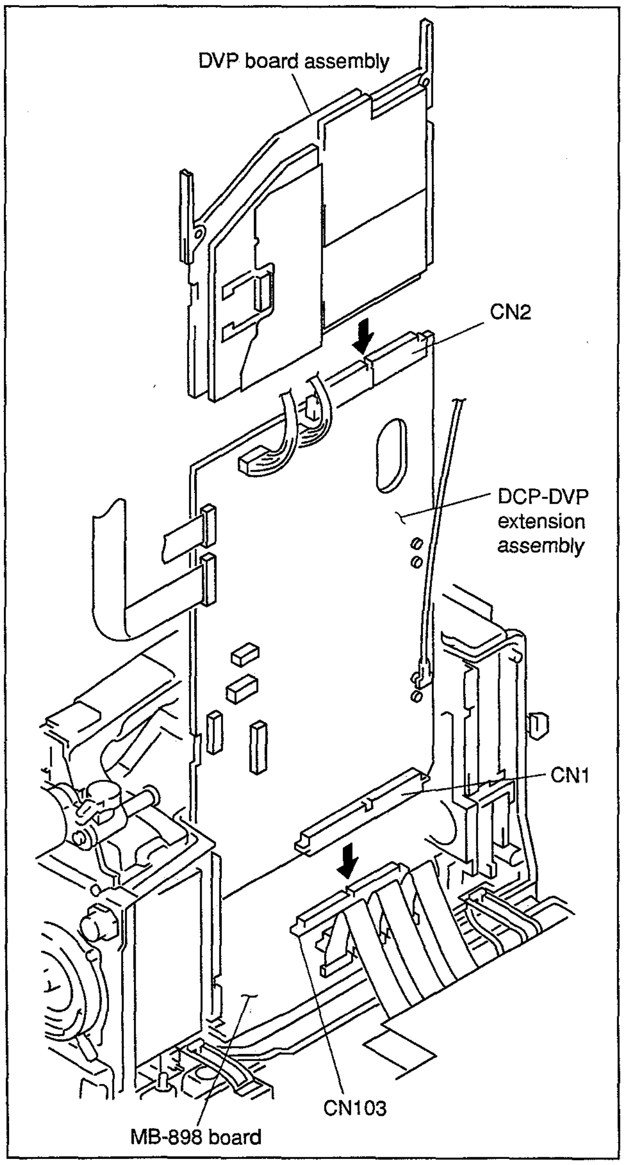
1-15-4. Extending the DVP Board Assembly

Notes

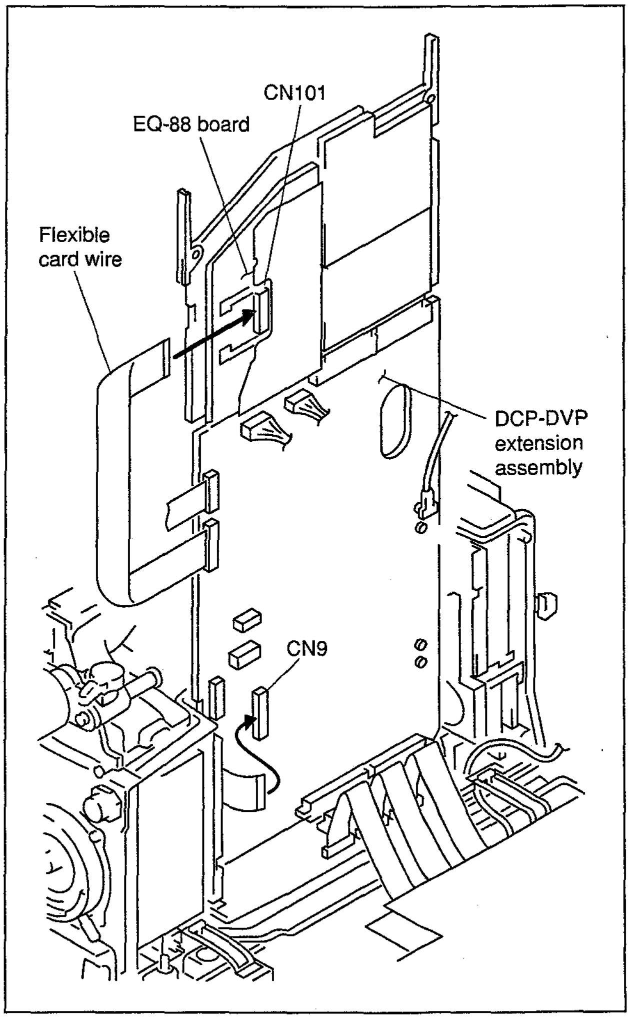
- Life of flexible card wire will be significantly shortened if it is folded. Be very careful not to fold the flexible card wire.
- Do not bend the coaxial cable strongly or do not damage the coaxial cable by hooking it on the frame.

Required tool : DCP-DVP extension assembly

1. Open the inside panel assembly. (Refer to Section 1-5.)
2. Remove the DCP board assembly. (Refer to Section 1-7-1.)
3. Remove the DVP board assembly. (Refer to Section 1-7-2.)
4. Connect the connector (CN1) of the DCP-DVP extension assembly to the connector (CN103) of the MB-898 board.
5. Connect the removed DVP board assembly to the connector (CN2) of the DCP-DVP extension assembly.


DVP board assembly
CN2
DCP-DVP extension assembly
CN1
CN103
MB-898 board

6. Connect the flexible card wire of the connectors (CN1) that are removed from in step 3, to the connectors (CN9) of the DCP-DVP extension assembly.
7. Connect the flexible card wire of the DCP-DVP extension assembly to CN101 of the EQ-88 board of the DVP board assembly
8. Attach the DCP board assembly that is removed in step 2, and connect the three harnesses and the coaxial cable, respectively. (Refer to Section 1-7-1.)


CN101
EQ-88 board
Flexible card wire
DCP-DVP extension assembly
CN9

1-15-5. Extending the DVP Board Assembly (When checking the B side and a part of the A side of the SS-92 board)

Required tools : EX-785 board, EX-784 board,
Flexible card wires (30 core, 250 mm/ 45 core, 250 mm) (DCP-DVP extension assembly),

Notes

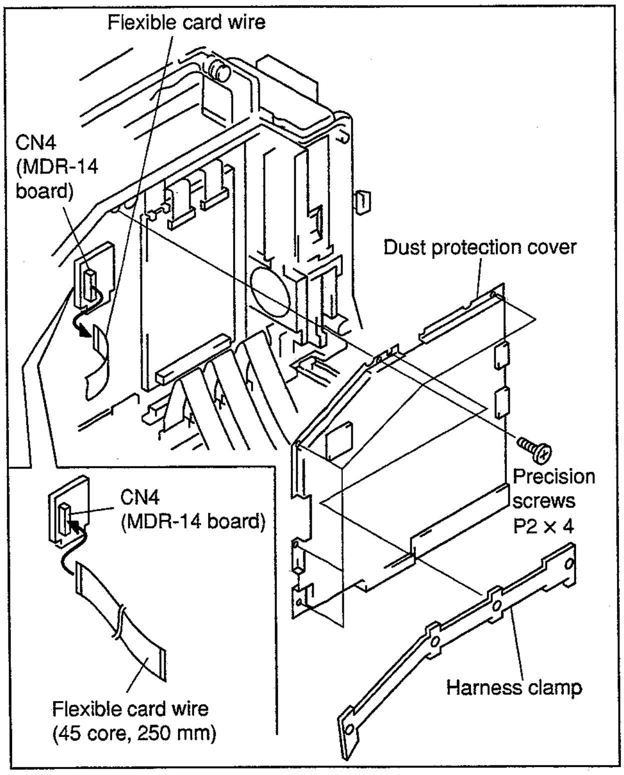
- Life of flexible card wire will be significantly shortened if it is folded. Be very careful not to fold the flexible card wire.
- Do not bend the coaxial cable strongly or do not damage the coaxial cable by hooking on the frame.

1. Open the inside panel assembly. (Refer to Section 1-5.)
2. Remove the DCP board assembly. (Refer to Section 1-7-1.)
3. Remove the DVP board assembly. (Refer to Section 1-7-2.)
4. Remove the harness clamp.

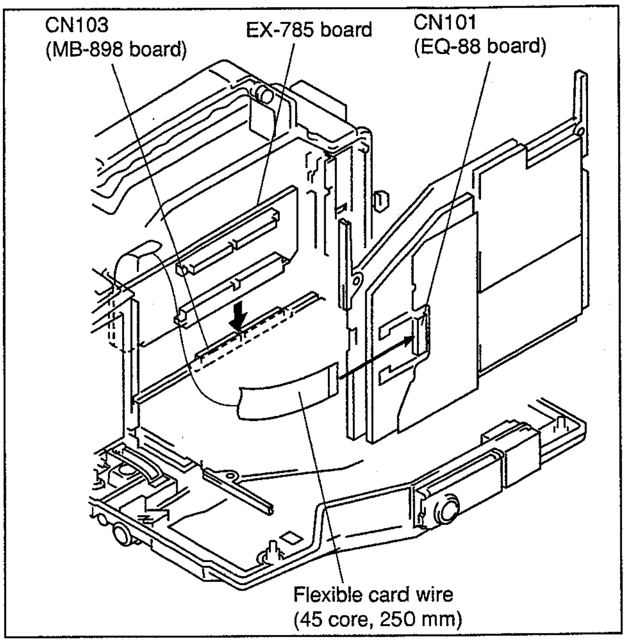
   Note

   Remove the harness clamp in case of that the shape of the harness clamp is the same as shown in illustration.

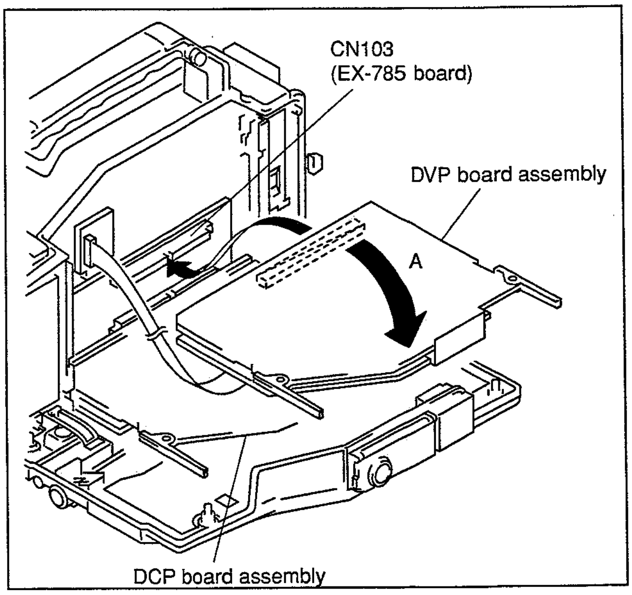
5. Remove the five screws and remove the dust protection cover.
6. Disconnect the flexible card wire from the connector (CN4) of the MDR-14 board. Instead of the flexible card wire, connect the optional flexible card wire (45 core, 250 mm) to the connector (CN4) of the MDR-14 board.


Flexible card wire
CN4 (MDR-14 board)
Dust protection cover
Precision screws P2 x 4
CN4 (MDR-14 board)
Flexible card wire (45 core, 250 mm)
Harness clamp

7. Extend the DCP board assembly using the EX-784 board, flexible card wire (30 core, 250 mm) and EX-776 board (DR extension assembly). (Refer to step 3 to 8 of Section 1-15-3.)
8. Connect the EX-785 board to the connector (CN103) of the MB-898 board.
9. Connect a coaxial cable to the connector (CN201) of the TX-78 board.
10. Connect the other end of the optional flexible card wire (45 core, 250 mm) that is connected in step 6, to the connector (CN101) of the EQ-88 board.


CN103 (MB-898 board)
EX-785 board
CN101 (EQ-88 board)
Flexible card wire (45 core, 250 mm)

11. Slant the DVP board assembly in the direction of arrow A and connect it to the connector (CN103) of the EX-785 board.


CN103 (EX-785 board)
DVP board assembly
A
DCP board assembly

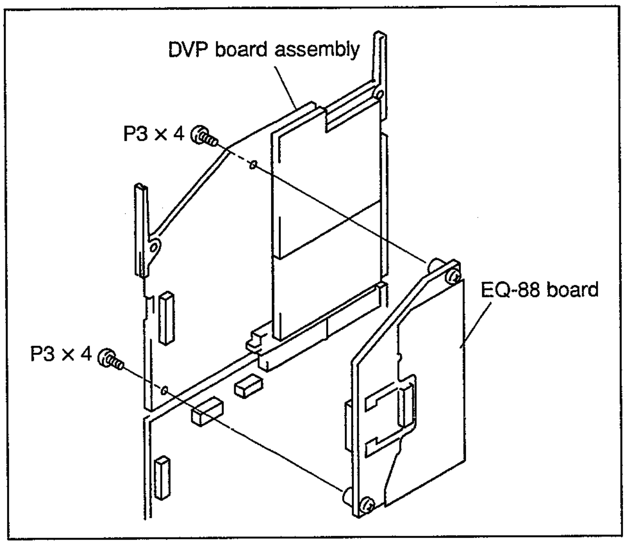
1-15-6. Extending the EQ-88 Board

Required tools : DCP-DVP extension assembly,
100P-EXT assembly

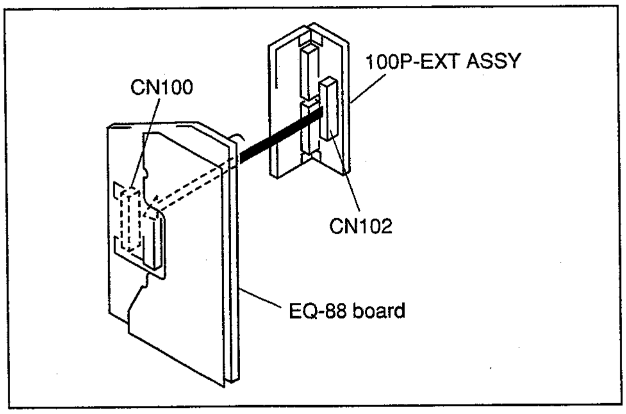
Notes

- Life of flexible card wire will be significantly shortened if it is folded. Be very careful not to fold the flexible card wire.
- Do not bend the coaxial cable strongly or do not damage the coaxial cable by hooking it on the frame.

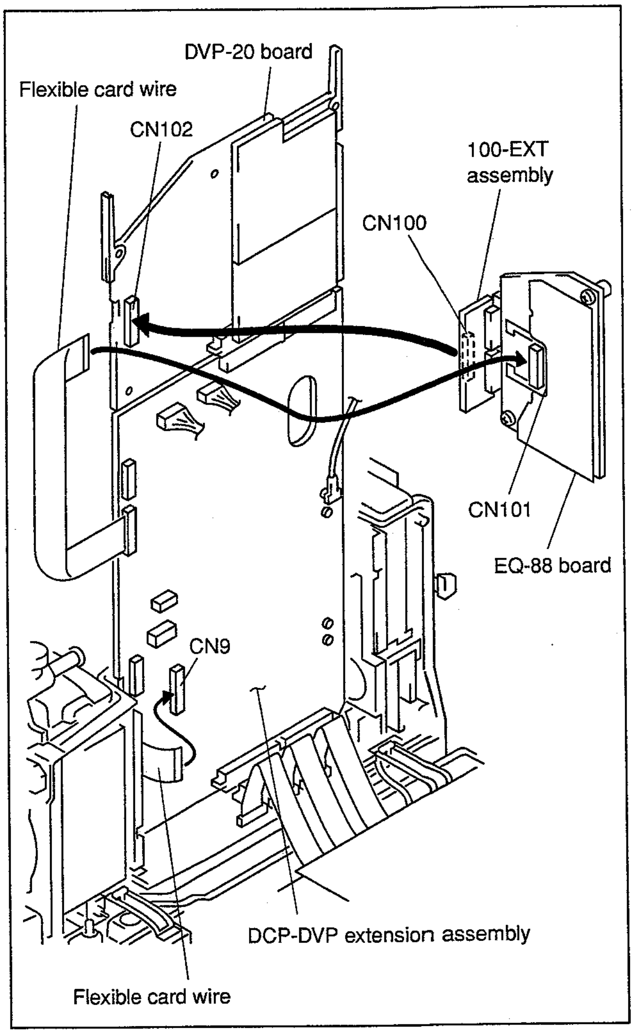
1. Perform steps 1 to 5 of "1-15-4. Extending the DVP Board Assembly".
2. Remove the two screws and remove the EQ-88 board.


DVP board assembly
P3 x 4
P3 x 4
EQ-88 board

3. Connect the connector (CN102) of the 100P-EXT assembly to the connector (CN100) of the EQ-88 board.


CN100
100P-EXT ASSY
CN102
EQ-88 board

4. Connect the connector (CN100) of the 100P-EXT assembly to the connector (CN102) on the DVP-20 board.
5. Connect the flexible card wire that is removed in step 1, to the connector (CN9) on the DCP-DVP extension assembly.
6. Connect the flexible card wire of the DCP-DVP extension assembly to the connector (CN101) on the EQ-88 board.
7. Connect the DCP board assembly that is removed in step 1, and connect the three harnesses, the flexible card wire and the coaxial cable respectively. (Refer to Section 1-7-1.)


DVP-20 board
Flexible card wire
CN102
100-EXT assembly
CN100
CN101
EQ-88 board
CN9
DCP-DVP extension assembly
Flexible card wire

1-15-7. Extending the SS-92 Board

Required tools : SS-EXT assembly,
Flexible card wire (45 core, 250 mm)
(4 wires)

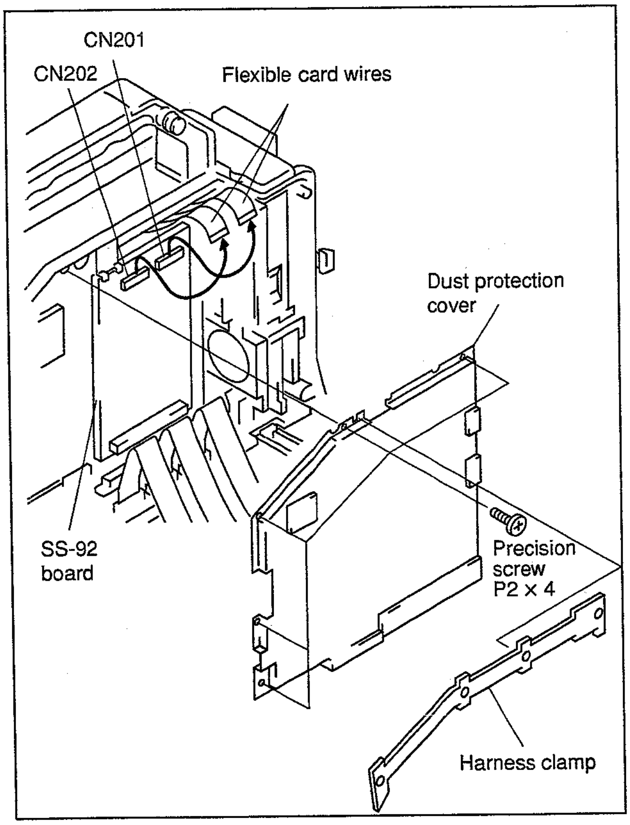
Note

Life of flexible card wire will be significantly shortened if it is folded. Be very careful not to fold the flexible card wire.

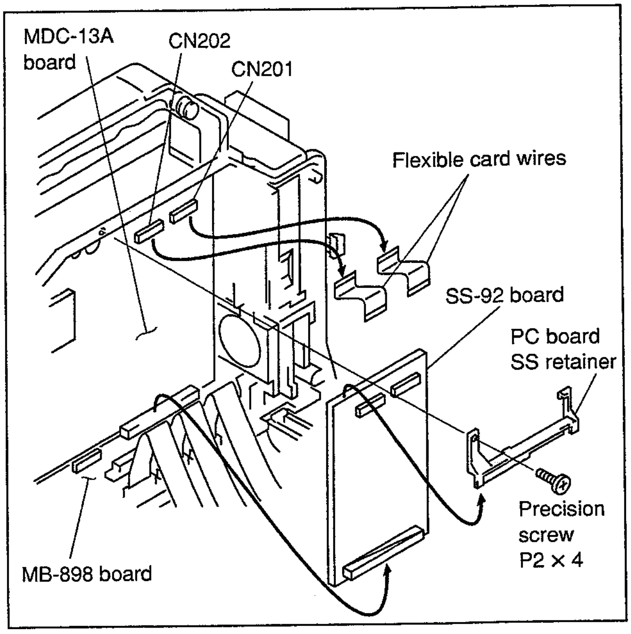
1. Open the inside panel assembly.
   (Refer to Section 1-5.)
2. Remove the DCP board assembly.
   (Refer to Section 1-7-1.)
3. Remove the DVP board assembly.
   (Refer to Section 1-7-2.)
4. Remove the harness clamp.

   Note

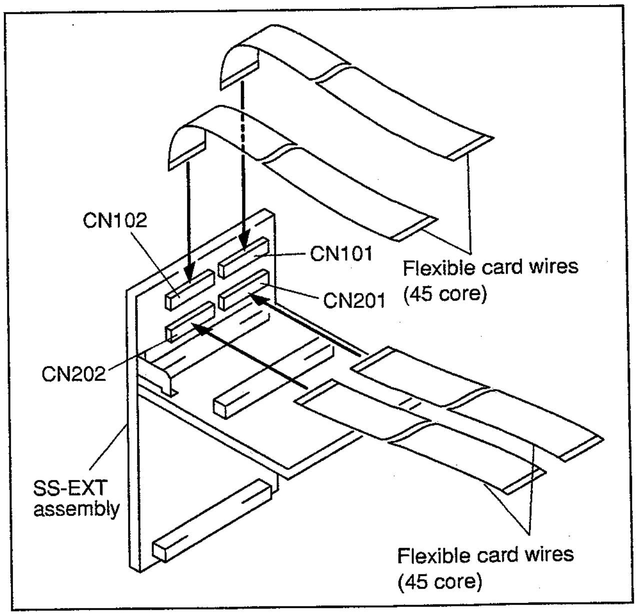
   Remove the harness clamp in case of that the shape of the harness clamp is the same as shown in illustration.
5. Remove the five screws and remove the dust protection cover.
6. Remove the flexible card wire from the connectors (CN201 and CN202) on the SS-92 board.


CN201
CN202
Flexible card wires
Dust protection cover
SS-92 board
Precision screw P2 x 4
Harness clamp

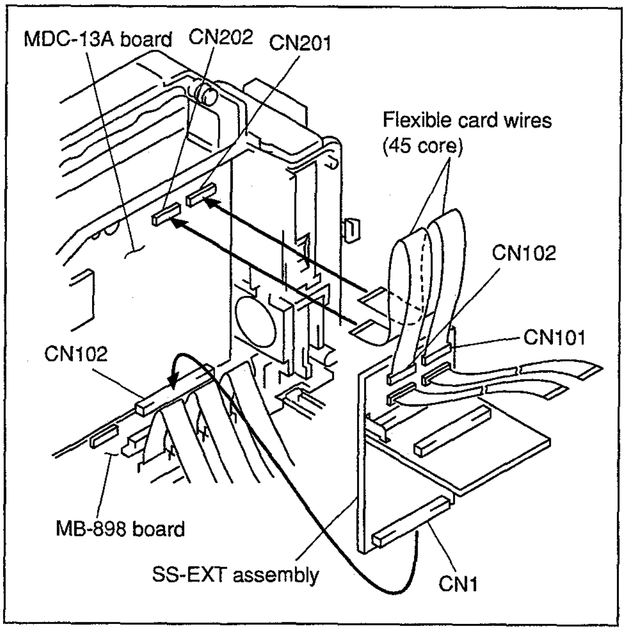
7. Remove the screw and remove the PC board SS retainer.
8. Remove the SS-92 board from the MB-898 board.
9. Disconnect the flexible card wire from the connectors (CN201, CN202) of the MDC-13A board.


MDC-13A board
CN202
CN201
Flexible card wires
SS-92 board
PC board SS retainer
Precision screw P2 x 4
MB-898 board

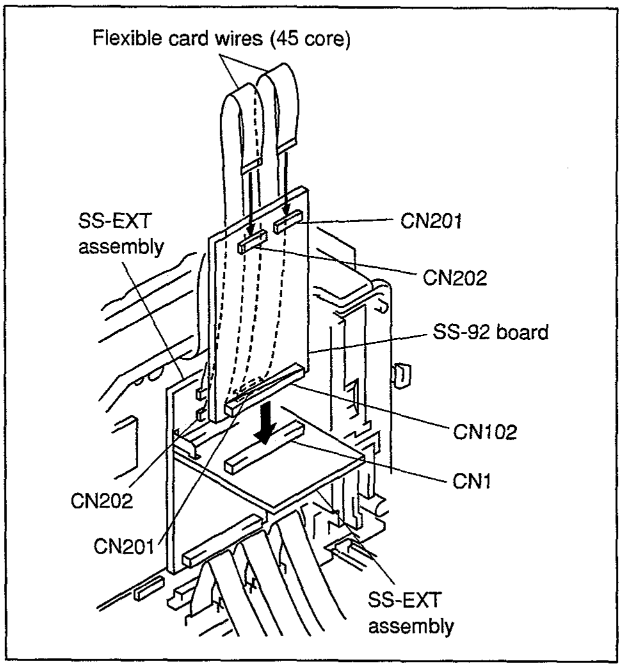
10. Connect the four optional flexible card wires (45 core) to the connectors (CN101, CN102, CN201, CN202) of the SS-EXT assembly.


CN102
CN101
Flexible card wires (45 core)
CN201
CN202
SS-EXT assembly
Flexible card wires (45 core)

11. Connect the connector (CN1) of the SS-EXT assembly to the connector (CN102) of the MB-898 board.
12. Connect the flexible card wires (45 core) that come from the connectors (CN101, CN102) on the SS-EXT assembly, to the connectors (CN201, CN202) on the MDC-13A board.


MDC-13A board
CN202
CN201
Flexible card wires (45 core)
CN102
CN101
CN102
MB-898 board
SS-EXT assembly
CN1

13. Connect the connector (CN102) of the SS-92 board to the connector (CN1) of the SS-EXT assembly.
14. Connect the flexible card wires (45 core) that come from the connectors (CN201, CN202) of the SS-EXT assembly, to the connectors (CN201, CN202) of the SS-92 board.


Flexible card wires (45 core)
SS-EXT assembly
CN201
CN202
SS-92 board
CN102
CN1
CN202
CN201
SS-EXT assembly

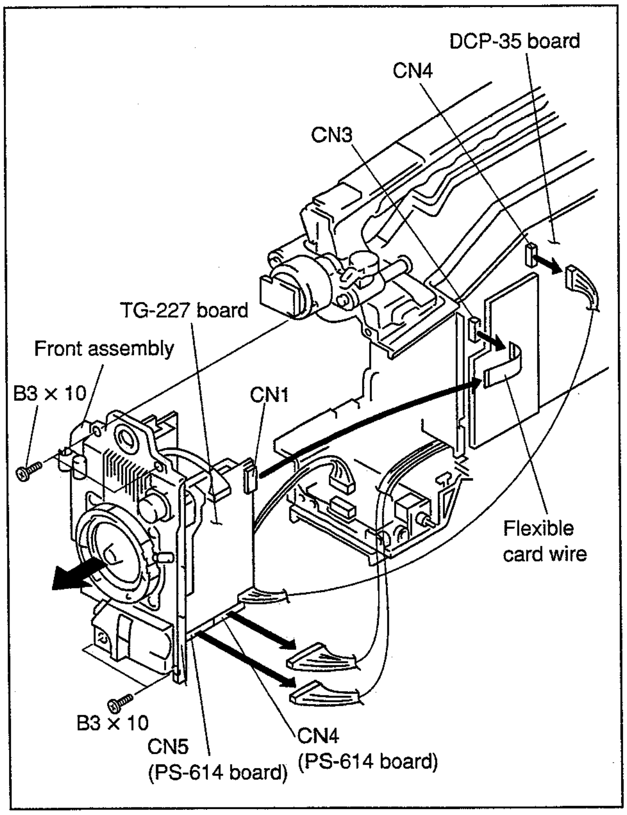
1-15-8. Extending the CCD Unit

Required tool : DR extension assembly (EX-776 board,
EX-831 board, EX-832 board),
Flexible card wire (30 core, 250 mm)

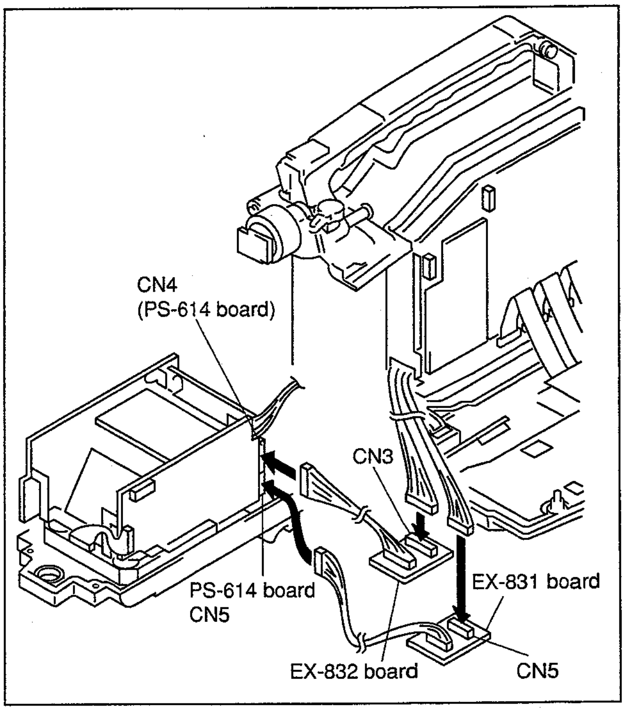
Notes

- Use the flexible card wire (30 core) supplied with the DCP-DVP extension assembly.
- Life of flexible card wire will be significantly shortened if it is folded. Be very careful not to fold the flexible card wire.

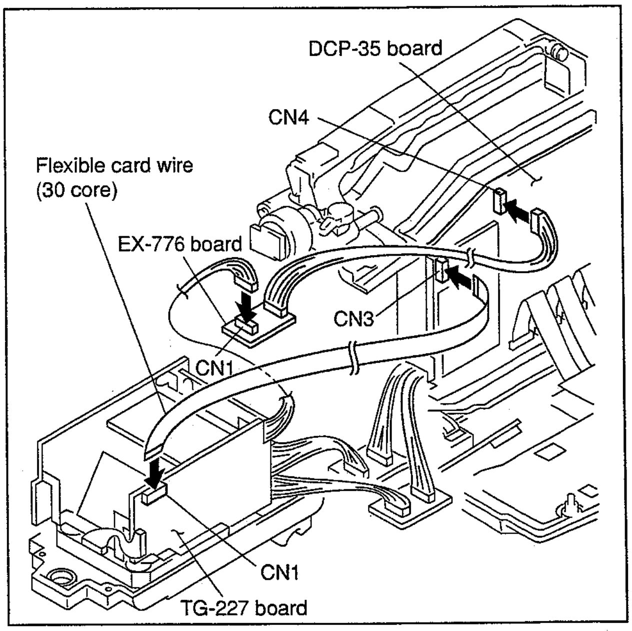
1. Open the outside panel assembly. (Refer to Section 1-4.)
2. Open the inside panel assembly. (Refer to Section 1-5.)
3. Disconnect the harness form the connector (CN4) of the DCP-35 board.
4. Remove the flexible card wires form the connector (CN3) of the DCP-35 board and from the connector (CN1) of the TG-227 board.
5. Disconnect the harness from the connectors (CN4, CN5) of the PS-614 board.
6. Remove the four screws and remove the CCD unit in the direction of the arrow.


DCP-35 board
CN4
CN3
TG-227 board
Front assembly
B3 × 10
CN1
Flexible card wire
B3 × 10
CN5 (PS-614 board)
CN4 (PS-614 board)

7. Connect the harness that is removed from the PS-614 board, to the connectors (CN3, CN5) of the EX-831 board and of the EX-832 board. Connect the harnesses of the EX-831 board and EX-832 board to the connectors (CN4, CN5) of the PS-614 board.


CN4 (PS-614 board)
CN3
PS-614 board CN5
EX-831 board
EX-832 board
CN5

8. Connect the harness that is removed from the DCP-35 board to the connector (CN1) of the EX-776 board. Connect the harness of the EX-776 board to the connector (CN4) of the DCP-35 board.
9. Connect the flexible card wire (30 core) to the connector (CN1) of the TG-227 board and to the connector (CN103 of the DCP-35 board.


DCP-35 board
CN4
Flexible card wire (30 core)
EX-776 board
CN3
CN1
CN1
TG-227 board

1-15-9. Extending the Mechanical Deck Assembly

Required tools : EX-764 board (3 boards),
Flexible card wire (45 core, 250 mm)
(6 wires)

Note

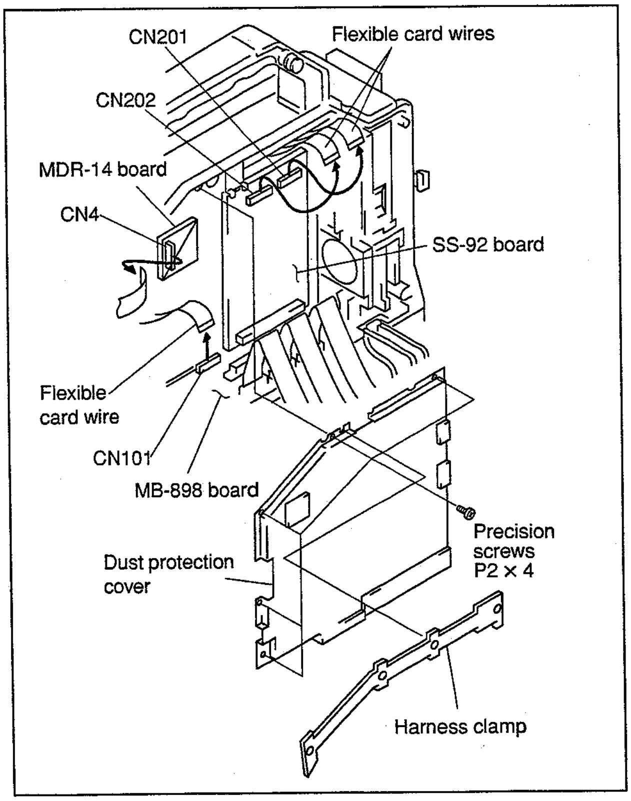
Life of flexible card wire will be significantly shortened if it is folded. Be very careful not to fold the flexible card wire.

1. Remove the outside panel assembly. (Refer to Section 1-4.)
2. Open the inside panel assembly. (Refer to Section 1-5.)
3. Remove the DCP board assembly. (Refer to Section 1-7-1.)
4. Remove the DVP board assembly. (Refer to Section 1-7-2.)
5. Remove the harness clamp.

   Note

   Remove the harness clamp in case of that the shape of the harness clamp is the same as shown in illustration.

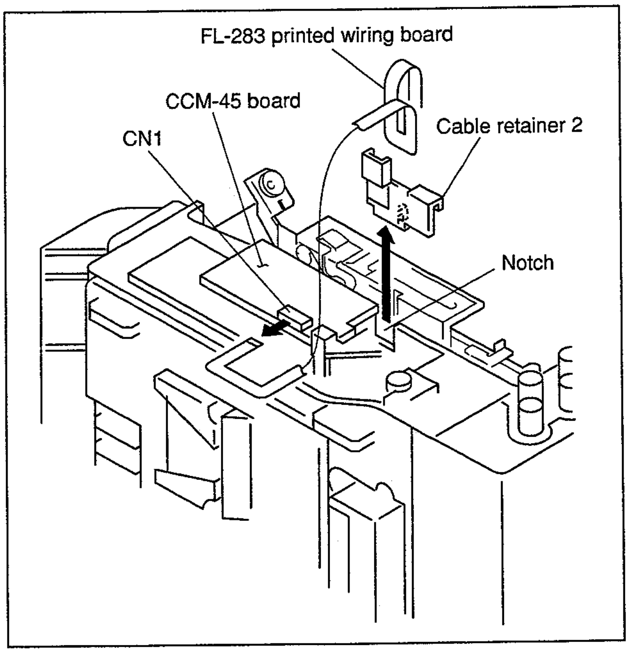
6. Remove the five screws and remove the dust protection cover.
7. Disconnect the flexible card wires from the connector (CN101) of the MB-898 board, the connectors (CN201, CN202) of the SS-92 board and the connector (CN4) of the MDR-14 board.


CN201
Flexible card wires
CN202
MDR-14 board
CN4
SS-92 board
Flexible card wire
CN101
MB-898 board
Precision screws P2 x 4
Dust protection cover
Harness clamp

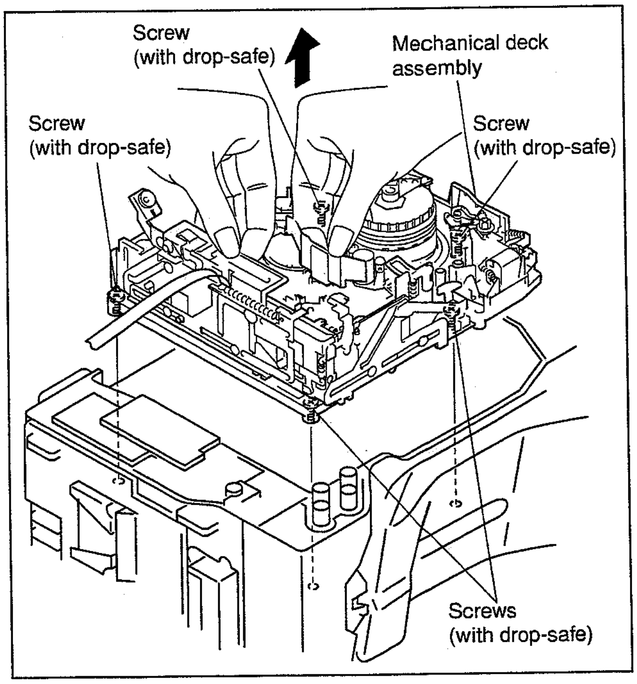
8. Remove the FL-283 printed wiring board from the connector (CN1) of the CCM-45 board.
9. While removing the cable retainer, remove the FL-283 printed wiring board.

   Note

   Life of FL-283 printed wiring board will be significantly shortened if it is folded. Be very careful not to fold the FL-283 printed wiring board.


FL-283 printed wiring board
CCM-45 board
CN1
Cable retainer 2
Notch

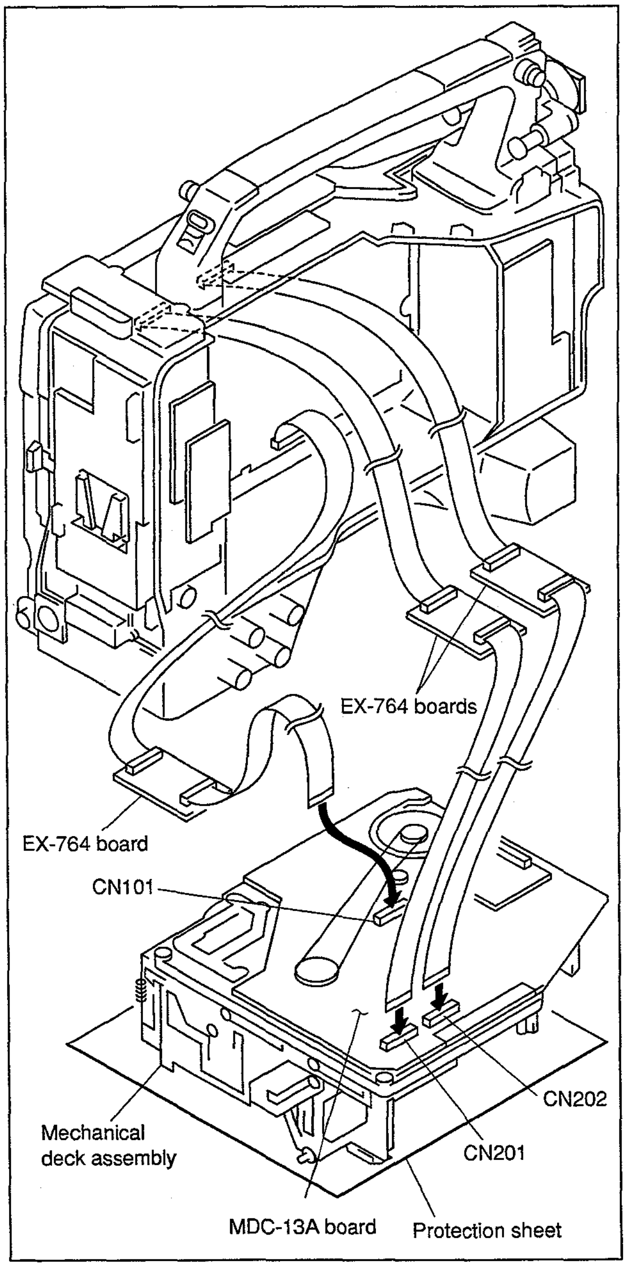
10. Loosen the five screws (with drop-safe) and move the mechanical deck assembly as shown in the illustration and remove it in the direction of the arrow.


Screw (with drop-safe)
Mechanical deck assembly
Screw (with drop-safe)
Screw (with drop-safe)
Screws (with drop-safe)

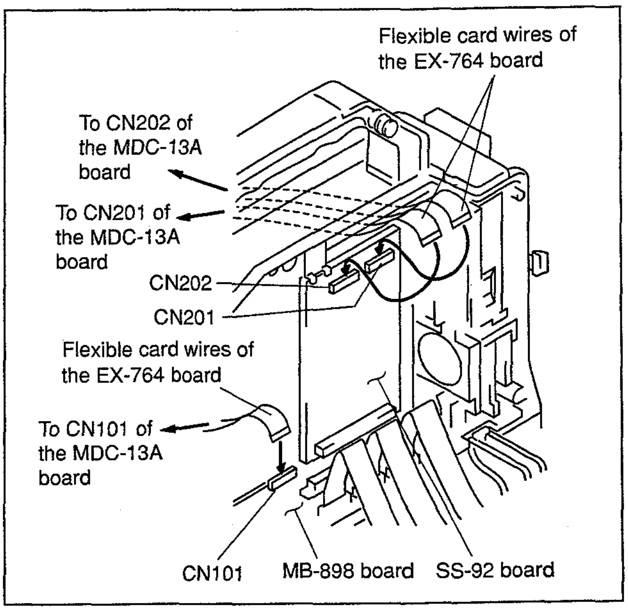
11. Prepare the three EX-764 boards and the six flexible card wires (45 core). Assemble them as shown in the illustration.
12. Connect the flexible card wires (45 core) that come from the respective extension boards, to the connector (CN101) of the MDC-13A board and to the connectors (CN201, CN202) of the MDC-13A board respectively.

Note

When extending the mechanical deck assembly, place a protection sheet underneath the mechanical deck assembly beforehand and extend it.


EX-764 boards
EX-764 board
CN101
Mechanical deck assembly
CN202
CN201
MDC-13A board
Protection sheet

13. Connect the flexible card wires of the EX-764 board to the connector (CN101) of the MB-898 board and to the connectors (CN201, CN202) of the SS-92 board respectively.

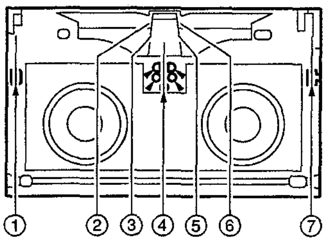

Flexible card wires of the EX-764 board
To CN202 of the MDC-13A board
To CN201 of the MDC-13A board
CN202
CN201
Flexible card wires of the EX-764 board
To CN101 of the MDC-13A board
CN101
MB-898 board
SS-92 board

1-16. Description on Cassette Mechanism

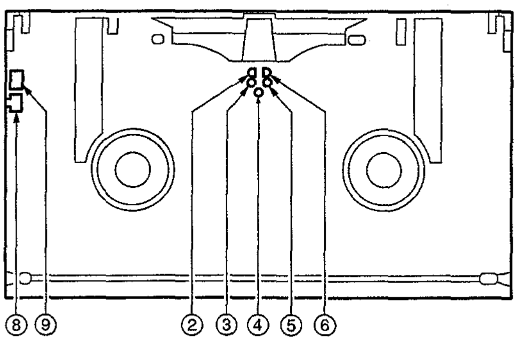
Cassette tape has the record inhibit plug and tabs for detecting various settings on the rear surface.

Cassette for MPEG IMX

Small cassette (S cassette)



Large cassette (L cassette)

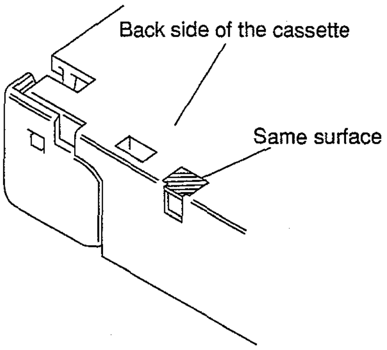


No.	Usage
①	S cassette analog REC inhibit hole
②	Tape thickness detection tab: Always closed.*1
③	Cassette classification detection tabs (See the column in the right)
④	Cassette classification detection tabs (See the column in the right)
⑤	Cassette classification detection tabs (See the column in the right)
⑥	Reel hub diameter detection tab With tab (close hole): Small hub Without tab (open hole): Large hub (Cleaning tape etc.)
⑦	S cassette digital REC inhibit tab
⑧	L cassette digital REC inhibit tab
⑨	L cassette analog REC inhibit hole

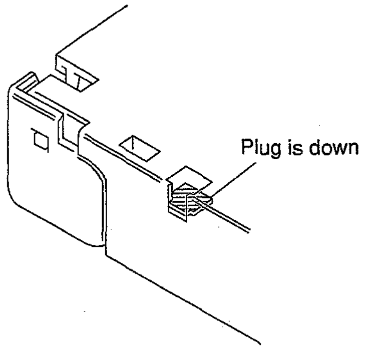
*1: Currently, there is only one tape thickness of the cassette for DIGITAL BETACAM/BETACAM-SX/MPEG IMX respectively.

REC Inhibit Plugs

<Recording possible>



<Recording impossible>



Cassette classification detection tabs
○ : with tab (close hole), ● : without tab (open hole)

Represents the cassette classification by combination of three tabs.

State of Tabs ③④⑤	Cassette Class	Remark
○○○	Betacam or Betacam SP	–
●○○	Betacam SX	–
○○●	Digital Betacam	This cassette cannot be used
○●○	HDCAM	The cassettes other cleaning cassette cannot be used
●●○	MPEG IMX	
●○●, ○●●, ●●●	Except the above class	These cassettes cannot be used

1-17. Adjustments/Setting Items When Boards are Replaced

When the following boards are replaced, implement the specified adjustments and checks referring to "8. Mechanical Alignment", "9. Electrical Alignment of Camera System" and "10. Electrical Alignment of VTR System". The boards that are specified below do not require adjustments and checks when they are replaced.

Board name	Section to be referred to
AT-143 board	1-17-12. AT-143 board
CCM-45 board	1-17-10. CCM-45 board
DCP-35 board	1-17-4. DCP-35 board
EQ-88 board	1-17-9. EQ-88 board
FP-121A board	1-17-8. FP-121A board
IFA-11 board	1-17-11. IFA-11 board
MDC-13A board	1-17-6. MDC-13A board
MDR-14 board	1-17-7. MDR-14 board
PS-614 board	1-17-2. PS-614 board
SS-92 board	1-17-13. SS-92 board
TG-227 board	1-17-1. TG-227 board
VA-208 board	1-17-3. VA-208 board
CCD unit	1-17-5. CCD unit

1-17-1. TG-227 Board

NV-RAM Adjustment Items

NV-RAM (IC110) is installed in the TG-227 board. When the TG-227 board is replaced, perform the following NV-RAM adjustments.

1. Set the switch S1/TG-227 board to ON and then set the switch S4/AT-143 board to ON.
2. Turn on the power.
3. Set the switch S1/TG-227 board to OFF. After 10 seconds have elapsed, set the switch S4/AT-143 board to OFF.
4. Turn off the power once then back ON. Doing this reset the data.
5. Keep pressing the AUTO W/B BAL switch (front block) in the BLK position for an extended time.

   Note

   When the AUTO W/B BAL switch is kept pressed in the BLK position, the display changes as follows. [BLACK SET] → [BLACK BAL] → [BLACK SET]. Keep pressing the switch until the second [BLACK SET] is displayed.

Adjustment Items when Board is Replaced

9-7. TEST SAW Adjustment
9-8. R/B AD Gain Adjustment
9-10. Shading Adjustment
9-10-1. Black Shading Adjustment
9-10-2. White Shading Adjustment
9-12. Black Set Adjustment
9-13. Flare Adjustment
9-14. Knee, White Clip Adjustment
9-14-1. Manual Knee, White Clip Adjustment
9-14-2. DCC Pre-Knee Adjustment
9-14-3. DCC Knee Adjustment

1-17-2. PS-614 Board

Replacing EEPROM

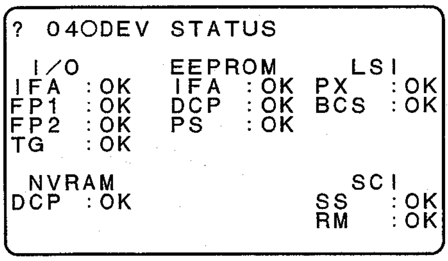
The EEPROM (IC5) is installed in the PS-614 board. When the PS-614 board is replaced, remove IC5 from the old PS-614 board and install it to the new PS-614 board.

Note

Because data cannot be re-set in the EEPROM (IC5), IC5 alone cannot be replaced.

When the EEPROM is replaced, check status of the EEPROM as follows.

1. Enter the DIAGNOSIS menu from the TOP menu.
2. Enter the "04 DEV STATUS" screen.
3. Confirm that "OK" is displayed in the PS item of the EEPROM column.



```
? 04ODEV STATUS
 I/O         EEPROM     LSI
IFA  :OK    IFA  :OK  PX    :OK
FP1  :OK    DCP  :OK  BCS   :OK
FP2  :OK    PS   :OK
TG   :OK

 NVRAM                   SCI
DCP  :OK                SS    :OK
                        RM    :OK
```

Adjustment Items when Board is Replaced

9-2. VCO CONT Adjustment
9-7. TEST SAW Adjustment
9-8. R/B AD Gain Adjustment
9-10. Shading Adjustment
9-10-1. Black Shading Adjustment
9-10-2. White Shading Adjustment
9-12. Black Set Adjustment
9-13. Flare Adjustment
9-14. Knee, White Clip Adjustment
9-14-1. Manual Knee, White Clip Adjustment
9-14-2. DCC Pre-Knee Adjustment
9-14-3. DCC Knee Adjustment

1-17-3. VA-208 Board

Adjustment Items when Board is Replaced

9-3. AD Clock Phase Adjustment
9-6. Modulator Balance Adjustment
9-7. TEST SAW Adjustment
9-8. R/B AD Gain Adjustment
9-9. VA Gain Adjustment
9-10. Shading Adjustment
9-10-1. Black Shading Adjustment
9-10-2. White Shading Adjustment
9-12. Black Set Adjustment
9-13. Flare Adjustment
9-14. Knee, White Clip Adjustment
9-14-1. Manual Knee, White Clip Adjustment
9-14-2. DCC Pre-Knee Adjustment
9-14-3. DCC Knee Adjustment

1-17-4. DCP-35 Board

The EEPROM (IC11) and NV-RAM (IC10) are installed in the DCP-35 board.
When these ICs are replaced, implement the following adjustments.

Adjustment Items when Board or EEPROM or NV-RAM is Replaced

NV-RAM reset and black balance adjustment.
(Refer to Section 1-10-1.)

Note

After the board replacement or the NV-RAM replacement, be sure to perform the NV-RAM reset and black balance adjustment before the adjustments as shown below.

9-2. VCO CONT Frequency Check
9-3. AD Clock Phase Adjustment
9-4. ENC OUT Adjustment
9-5. TEST OUT Level Adjustment
9-7. TEST SAW Adjustment
9-8. R/B AD Gain Adjustment
9-9. VA Gain Adjustment
9-10-1. Black Shading Adjustment
9-10-2. White Shading Adjustment
9-13. Flare Adjustment
9-14-2. DCC Pre Knee Adjustment

1-17-5. CCD Unit

Adjustment Items when CCD Unit is Replaced

9-2. VCO CONT Frequency Adjustment

1-17-6. MDC-13A Board

The EEPROM (IC403) is installed in the MDC-13A board. Implement the following adjustments when this IC is replaced, too.

Note

Be sure to implement the setting which enables to save the contents of the EEPROM to the backup RAM before replacing the MDC-13A board. (Refer to Section 11-3-6.) When this setting is performed, the contents of the backup RAM are restored into EEPROM at the first power-on after the MDC-13A board is replaced.

Setting Items before Staring to Replace the Board or EEPROM

Saving the backup data of EEPROM contents

11-3-6. MDC-13A Board Change

Adjustment Items when Board or EEPROM is Replaced

Initialization of servo adjustment data

10-4-1. Servo System Adjustment Data Initialization

Servo system alignment

10-4-2. Capstan FG Duty Ratio Adjustment
10-4-3. Capstan Add-On Recording Adjustment
10-4-4. Drum Phase Adjustment

1-17-7. MDR-14 Board

Adjustment Item when the Board is Replaced

Servo system alignment

10-4-4. Drum Phase Adjustment

1-17-8. FP-121A Board

Adjustment and Setting Items when the Board is Replaced

System control adjustment and setting

Setting the data and time of internal watch
(For the setting procedure, refer to " 4-8. TIME/DATE Display".)
10-4-1. Voltage Correction Adjustment

Audio system alignment

10-2-1. CH1 Unity Level Adjustment (For VCA)
10-2-2. CH2 Unity Level Adjustment (For VCA)
10-2-3. Side VR Voltage Adjustment (For VCA)
10-2-4. AGC Voltage Adjustment (For VCA)
10-2-5. CH1, CH2 Output Adjustment (Analog EE)
10-2-6. CH1, CH2 Distortion Factor Adjustment
10-2-7. Input Limiter Adjustment
10-2-8. D/A Output Adjustment
10-2-9. CH1, CH2 Output Check
10-2-10. Output Limiter Adjustment

1-17-9. EQ-88 Board

The EEPROM (IC1104) is installed in the EQ-88 board. Implement the following adjustments when this IC is replaced.

Adjustment Item when the Board is Replaced

RF System Adjustment

10-5-1. RF System Continuous Automatic Adjustment
10-5-2. Saving the RF System Adjustment Data
10-5-3. PB Channel Condition Check
10-5-4. REC Channel Condition Check

1-17-10. CCM-45 Board

Adjustment Item when the Board is Replaced

10-4-2. Antenna Tuning Frequency Adjustment

1-17-11. IFA-11 Board

EEPROM Replacement

The EEPROM (IC202) is installed in the IFA-11 board. When the IFA-11 board is replaced, remove IC202 from the old board and install it to the new IFA-11 board.

Note

Because data cannot be re-set in the EEPROM (IC202), IC202 alone cannot be replaced.

1-17-12. AT-143 Board

Setting the On-Board switch

When the circuit board is replaced, select NTSC or PAL in accordance with the user's operating environment.

Ref. No.	Address	Name	Description	Factory setting
S2-3	(C-4/B side)	NTSC /PAL	Select the signal system of the MSW-900/900P main unit. ON : PAL OFF :NTSC	For NTSC : OFF For PAL : ON

Note

- The switch S101-8/SS-92 board has the same function. NTSC/PAL system selection is set only when both of the switches are set to the same system.
- When the circuit board is replaced, the new (replacement) circuit board is shipped from the factory with the defaul tsetup that is OFF.When you use the circuit board in the PAL system, be sure to set this switch to ON.

1-17-13. SS-92 Board

Setting the On-Board Switch

When the circuit board is replaced, select NTSC or PAL in accordance with the user's operating environment.

Ref. No.	Address	Name	Description	Factory setting
S101-8	(C-2/A side)	NTSC /PAL	Selects the signal system of the MSW-900/900P main unit. ON : PAL OFF :NTSC	For NTSC : OFF For PAL : ON

Note

- The switch S2-3/AT-143 board has the same function. NTSC/PAL system selection is set only when both of the switches are set to the same system.
- When the circuit board is replaced, the new (replacement) circuit board is shipped from the factory with the defaul tsetup that is OFF.When you use the circuit board in the PAL system, be sure to set this switch to ON.

1-18. Contents of the EEPROM and NV-RAM Data

The data that is stored in the EEPROM and NV-RAM on the respective boards, is shown below.

Note

Part numbers of the following ICs are shown in Vol. 2 Section “1. Spare Parts” of the separate Maintenance Manual are the ICs before saving the data contents.

Board	Ref.No. (address)	EEPROM/ NV-RAM	Contents of the saved data	Adjustment/setup upon replacement of EEPROM/NV-RAM
DCP-35	IC11 (A-2/B side)	EEPROM	DCP board factory set value Black Set adjustment value	*1
	IC10 (A-3/B side)	NV-RAM	All of the setup data of the setup menu AWB/ABB data	
IFA-11	IC202 (A-2/A side)	EEPROM	Model name, Serial No., OEM code, Model code, Device ID	*2
MDC-13A	IC403 (G-2/A side)	EEPROM	Servo system adjustment value, Hours meter	Refer to Section 1-17-6.
FP-121A	IC801 (F-2/B side)	RAM inside CPU	Hours meter	*3
EQ-88	IC1104 (B-1/A side)	EEPROM	RF system adjustment value	Refer to Section 1-17-9.
TG-227	IC110 (C-1/A side)	NV-RAM	Unique data of CCD block	Refer to Section 1-17-1.
PS-614	IC5 (B-2/A side)	EEPROM	Unique data of CCD block	*2

*1 : Users' unique data is saved in IC11 and IC10 of the DCP-35 board. When these ICs are replaced on the occasion of board replacement or IC replacement, the users' unique data will be lost and the data is returned to the default data when the unit is shipped from the factory. For the menu setting, refer to Section 4 and re-set the data. For the adjustment items that are required in accordance with the replacement, refer to Section 1-17-4.

*2 : IC202 on the IFA-11 board and IC5 on the PS-614 board cannot be replaced because their data cannot be re-set. When the IFA-11 board or PS-614 board is replaced, remove the old IC from the old board and install the old IC to the new board. When IC202/IFA-11 board or IC5/PS-614 board needs to be replaced due to defective IC, contact your local Sony Sales Office/Service Center.

*3 : Data cannot be saved in IC801 on the FP-121A board.
When IC needs to be replaced due to defective IC, contact your local Sony Sales Office/Service Center.

1-19. Description of the CCD Block Number

1-19-1. CCD Block Number

All of the CCD units have their unique ID numbers. This number is called the CCD block number indicating the type of the CCD block and serial number.
The label indicating the CCD block number is attached inside of each CCD unit.

Example) IWA xxxxx
xxxxx — Serial number of the CCD unit
IWA — Type of the CCD block

Aplicable Model (Serial No.)	Type of the CCD Bock
MSW-900 (10001 -)	IVA
MSW-900P (40001 -)	IWA

For the replacement procedure of the CCD unit, refer to "6-1-1. CCD Unit Replacement".

1-19-2. On Mount Ring

Repair part (Sony part No. 3-186-442-0x) of the mount ring that is used in the CCD unit, has the different shape from the mount ring that is used in the factory-shipped product. However, replacing the mount ring with a new one for repair is no problem since both parts have complete interchangeability each other.

1-20. Filter Knob Position Adjustment

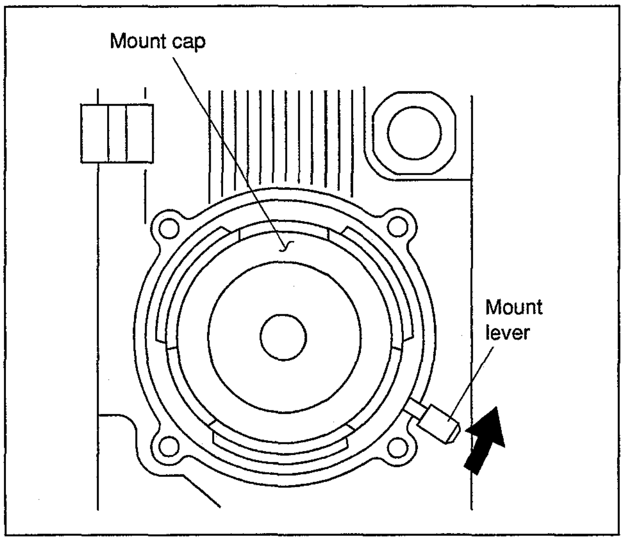
Note

Procedure of the filter knob position adjustment is different depending upon the serial number of the Camcorder.

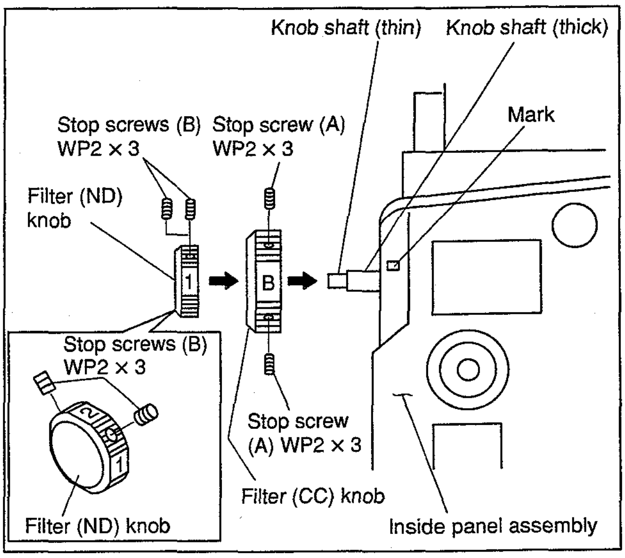
1. Move the mount lever in the direction of the arrow and remove the mount cap.

   Note

   Be very careful not to touch the filter surface when the mount cap is removed.


Mount cap
Mount lever

2. Rotate the knob shaft (thick) until the filter of the thinnest color is visible from the front.
3. Align the file (CC) knob number "B" with the mark on the inside panel assembly and attach it with the use of the two stop screws (A).
4. Rotate the knob shaft (thin) until the filter of the thinnest color is visible from the front.
5. Align the file (ND) knob number "1" with the mark on the inside panel assembly and attach it with the use of the two stop screws (B).


Knob shaft (thin)
Knob shaft (thick)
Mark
Stop screws (B) WP2 x 3
Stop screw (A) WP2 x 3
Filter (ND) knob
1
B
Stop screws (B) WP2 x 3
Stop screw (A) WP2 x 3
Filter (CC) knob
Filter (ND) knob
Inside panel assembly

Note

Standard tightening torque :

WP2 × 3 : 20 to 25 × 10^{-2} N•m (2 to 2.5 kgf•cm)

1-21. Memory Backup Battery

WARNING

The lithium battery is critical part to safe operation. Replace the component with Sony part whose part number appears in the manual published by Sony. If the component is replaced by any part other than the specified ones, this may cause a fire or electric shock.

CAUTION

When replacing the lithium battery, ensure that the battery is installed with "+" and "−" poles connected to the correct terminals.
An improper connection may cause an explosion or leakage of fluid result in physical damage in the surrounding materials.

The BP-33 board is equipped with the data backup battery (BT101). When replacing it, be sure to use the specified part.

Replacement part : BT101 (on the BP-33 board)
Part name : CR-2450 (lithium battery)
Part No. : ⚠1-528-229-41
Recommended replacement period : Every five years

The memory IC stores the data such as date and time. If the backup memory battery is dead or replaced, these data are all cleared.
Re-set the cleared data by referring to Operation Manual "4-8-6. Setting Date and Time of Internal Watch".

1-22. Fuse and IC Link Replacement

WARNING

The fuse and IC link are critical parts to safe operation. Replace the components with Sony parts whose part number appear in the manual published by Sony. If the components are replaced by any parts other than the specified ones, this may cause a fire or electric shock.

CAUTION

If a fuse or IC link is replaced while the main power is kept on, this may cause electric shock.
Before replacing fuse or IC link, not only turn off the POWER switch but also remove the power cable that is connected to the DC IN connector.

The EQ-88 board is equipped with fuse. The SS-92 board is equipped with IC link.
Any an excessive current flow due to abnormality inside the equipment, the fuse and IC link blow. If a fuse or IC link blows, turn off the main power of the equipment once and inspect inside of the equipment and remove the cause of excessive current. After that, replace the fuse and/or IC link.

Board	Ref. No.	Description	Part No.
EQ-88	F101, 102, 103	Fuse (4 A/250 V)	⚠1-576-270-11
SS-92	PS201, 202	IC link 2 A	⚠1-576-259-11

1-23. Circuit Protection Element

The CNB-15 board of this unit is equipped with the positive characteristics thermister (power thermister) as the circuit protection element. The positive characteristics thermister limits the electric current flowing through the circuit as the internal resistance increases when an excessive current flows or when the ambient temperature increases. If the positive characteristics thermister works, turn off the main power of the unit and inspect the internal circuit of this unit. After the cause of the trouble is removed, turn on the main power back again. The unit works normally. It takes about one minute to cool down the positive characteristics thermister after the main power is turned off.

Board	Ref. No.	Address	Protection circuit/ equipment
CNB-15	THP1	A8	Internal circuit of the board

1-24. Upgrading the ROM Version

The AT-143 board, EQ-88 board, FP-121A board and SS-92 board of this unit are equipped with ROMs.

Board	Ref.No.	Address
AT-143	IC38	A-2/B side
EQ-88	IC1101	D-1/B side
FP-121A	IC801	F-2/B side
SS-92	IC8	C-3/A side

- For upgrading the ROM version of the AT-143 board, there are two methods. One is the method to use a memory stick for version upgrading. The other one is to use the ROM-28 board that is available as the tool. However, when the ROM is replaced with the new one, a memory stick cannot be used for upgrading. In such a case, use the ROM-28 board. Except the case of ROM replacement, the ROM version can be upgraded by either of the two methods.
- For upgrading the ROM version of the FP-121A board and SS-92 board, use the memory stick.
- ROM on the EQ-88 board does not need upgrading.

1-24-1. When a Memory Stick is Used for Version Upgrading (AT-143 Board, FP-121A Board, SS-92 Board)

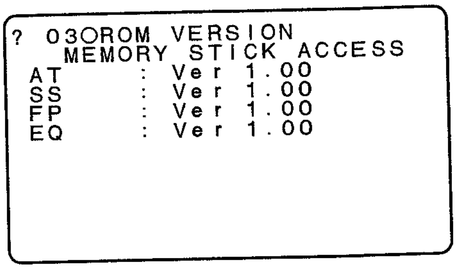
Notes

- The upgrading program must have already been saved in a memory stick before.
  (For details of saving the upgrading program, contact your local Sony Sales Office/Service Center.)
- For the basic operations of the setup menu, refer to Section 4-1-1.
- The following display is the sample when upgrading ROM from Ver.1.00 to Ver.1.01.

1. Turn on the main power and set the MENU ON/OFF switch to ON.
2. Let the display show the ROM VERSION submenu of the DIAGNOSIS menu.
3. Insert the memory stick in which the upgrading program is already saved. Press the rotary encoder for a few seconds until the system enters the version upgrade mode.
   The message “MEMORY STICK ACCESS” appears on display. (If a memory stick is not inserted, the message “NO MEMORY STICK” appears.)

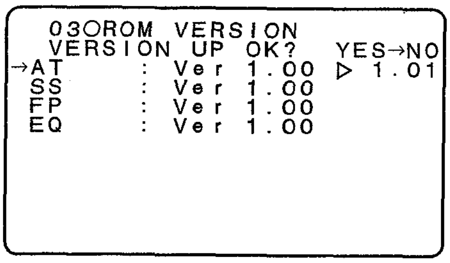
   Note

   Do not remove the memory stick while message “MEMORY STICK ACCESS” appears on display.



```
?  03OROM  VERSION
     MEMORY  STICK  ACCESS
  AT        :  Ver  1.00
  SS        :  Ver  1.00
  FP        :  Ver  1.00
  EQ        :  Ver  1.00
```

4. Select the desired ROM that you want to upgrade the version. Then press the rotary encoder. The following confirmation message appears as follows.
   When a newer version than the current version is read : VERSION UP OK?
   When the same version as the current version is read : SAME VERSION OK?
   When an older version than the current version is read : VERSION DOWN OK?



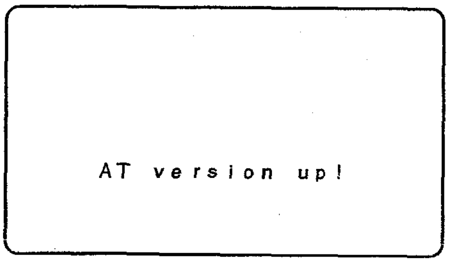
```
 030ROM VERSION
 VERSION UP OK?   YES→NO
→AT    : Ver 1.00 ▷ 1.01
 SS    : Ver 1.00
 FP    : Ver 1.00
 EQ    : Ver 1.00
```

5. Selecting YES and pressing the rotary encoder starts upgrading of the selected ROM version.
6. In the case of the ROM on the AT-143 board:

(1) The following displays to execute the version upgrade appear.

Note

Never remove a memory stick or never turn off the main power until the message "COMPLETE" appears.

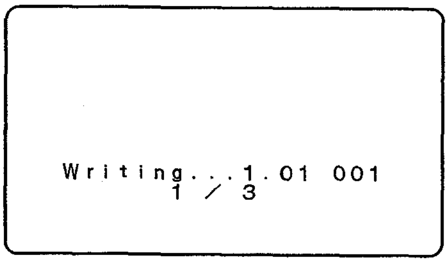


```
AT version up!
```

] The dislay is switched in an instance.

```
"      Initializing...      "
              ↓
"        Checking...        "
              ↓
"Reading ROM data ..."
```

(2) Within several seconds, the following message appears.



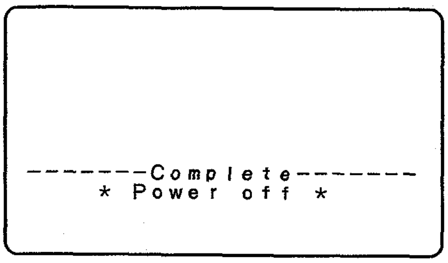
```
Writing...1.01 001
     1 / 3
```

← Flashing

] The dislay is switched in about five seconds.

```
"          2 / 3          "
             ↓
"          3 / 3          "
```

(3) Within five seconds, the following message appears.

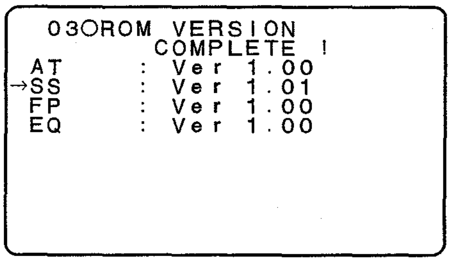


```
-------Complete-------
  * Power off *
```

← Flashing

In the case of ROM on the FP-121A board and SS-92 board:

(1) Check to see that the message "COMPLETE !" appears indicating that the version indication has changed.



```
 03OROM VERSION
        COMPLETE  !
 AT   : Ver 1.00
→SS   : Ver 1.01
 FP   : Ver 1.00
 EQ   : Ver 1.00
```

7. Turn off the main power and then back on to start the unit for upgrading of the ROM to take place.

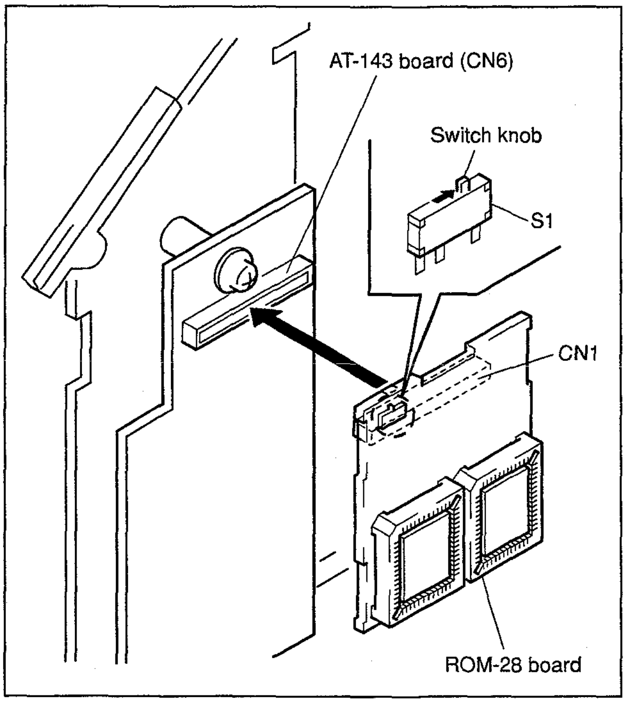
1-24-2. When the ROM-28 Board is Used for Version Upgrading (AT-143 Board)

Required tool : ROM-28 board
(Sony part No. : A-8326-017-A)

Note

The upgrading program must have already been saved in the ROMs (IC2, IC3) on the ROM-28 board before.
(For details of saving the upgrading program, contact your local Sony Sales Office/Service Center.)

1. Open the inside panel assembly.
   (Refer to "1-5. Opening and Closing the Inside Panel Assembly".)
2. Insert CN1 of the ROM-28 board to CN6 on the AT-143 board.



3. Set the switch S1 on the ROM-28 board as shown in the illustration.
4. Turn on the main power. Then the data stored in the ROM-28 board are transferred to the ROM on the AT-143 board in 10 and a few seconds.
5. Turn off the main power and remove the ROM-28 board.
6. Close the inside panel assembly.
   (Refer to "1-5. Opening and Closing the Inside Panel Assembly".)
7. Turn on the main power to start the unit for upgrading of the ROM to take place.

1-24-3. When the FL-272 Board is Used for Version Upgrading (SS-92 Board)

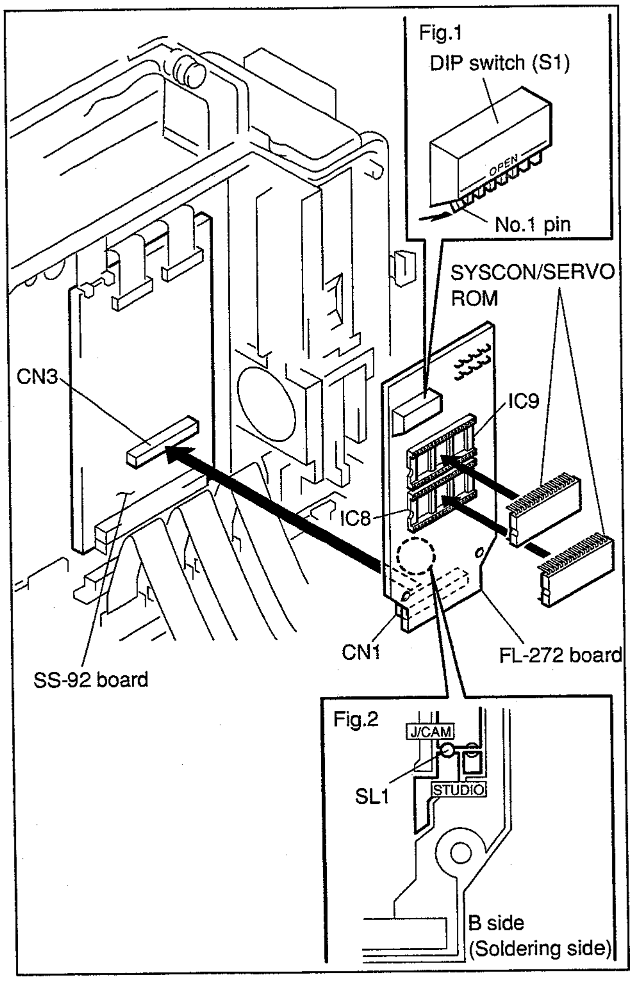
Required tool : FL-272 board
(Sony part No. : J-6531-280-A)
SYSCON/SERVO ROM
(Sony part No. : J-6531-320-A)

1. Open the inside panel assembly. (Refer to Section 1-5.)
2. Remove the plug-in board assembly. (Refer to Section 1-7.)
3. Remove the dust protection cover. (Refer to Section 1-15-7.)
4. Insert the SYSCON/SERVO ROMs to the IC sockets (IC8, IC9) on side A of the FL-272 board.

   Note

   The IC numbers printed on the ROM label should match with the IC numbers printed on the circuit board.

5. Set the switch No.1 only of the DIP switch (S1) on the FL-272 board. (See Fig. 1.)
6. Short-circuit the solder slit (SL1) on side B of the FL-272 board.
7. Turn off the power. Insert CN1 of the FL-272 board to CN3 of the SS-92 board.



8. Turn on the power. Erasing the software starts.
   (After the diode D6 turns on, the diodes flash in the order of D8→D4→D7.)
   After that, writing the software starts.
   (After the diode D2 turns on, the diodes flash in the order of D8→D4→D7.)
9. When you confirm that the diode D5 on the FL-272 board lights, turn off the power.
10. Remove the FL-272 board from the SS-92 board.
11. Turn on the power and confirm that the system initialization has ended with success and the system starts up normally.
12. Upgrade the software version using memory stick. (Refer to Section 1-24-1.)

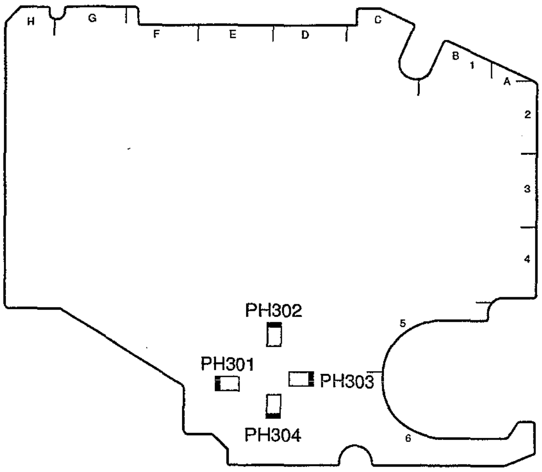
1-25. How to Replace the Photo Sensors on the MDC-13A Board

The four photo sensors (PH301 to PH304) are installed on the MDC-13A board of this unit.
To replace these photo sensors, the accurate position setting of the sensors is required with the use of the DIF-110 sensor mount tool.

Required tool : DIF-110 sensor mount tool
(Part No. J-6531-100-A)

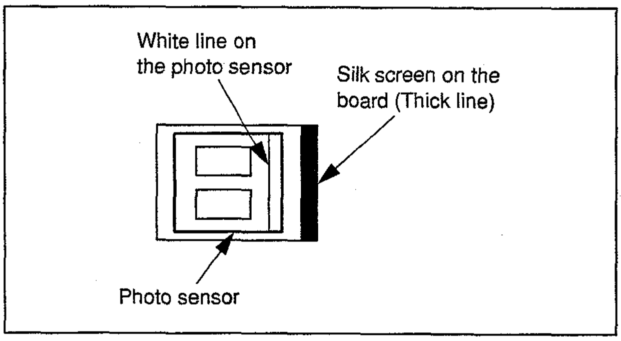
Note

If the sensors are not mounted in the correct positions, the cam gear position will not be correctly detected, which that causes malfunction of the unit.

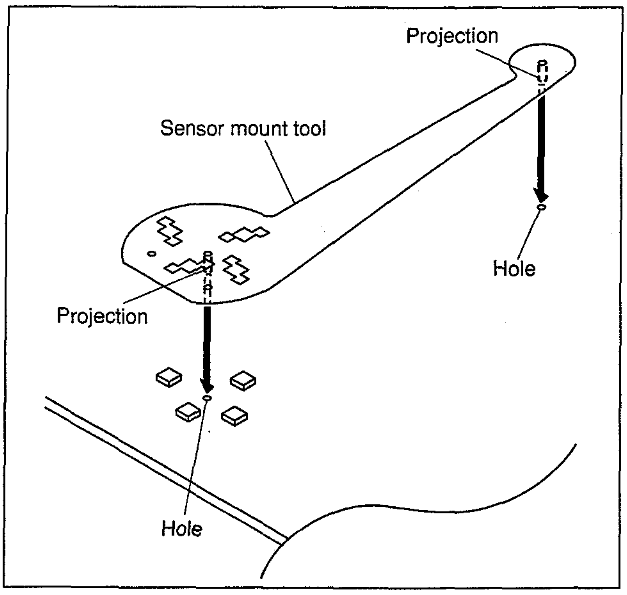

H
G
F
E
D
C
B
1
A
2
3
4
5
6
PH302
PH301
PH303
PH304

MDC-13A board (B side)

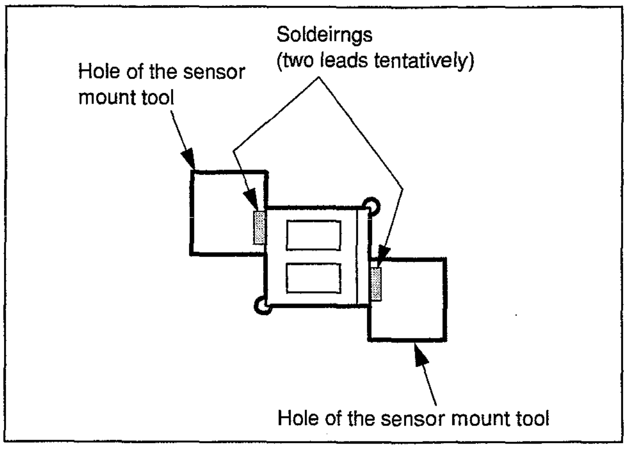
1. Remove soldering from the photo sensor that you want to replace and remove the photo sensor.
2. Place a new photo sensor on a solder land tentatively. Be careful to place a new photo sensor in the correct direction. (Refer to the illustration below.)


White line on the photo sensor
Silk screen on the board (Thick line)
Photo sensor

3. Align the two projections of the sensor mount tool with the holes of the board.


Projection
Sensor mount tool
Hole
Projection
Hole

4. Solder the two leads of a photo sensor by soldering.


Soldeirngs (two leads tentatively)
Hole of the sensor mount tool
Hole of the sensor mount tool

5. Remove the sensor mount tool and solder the four leads of the photo sensor.

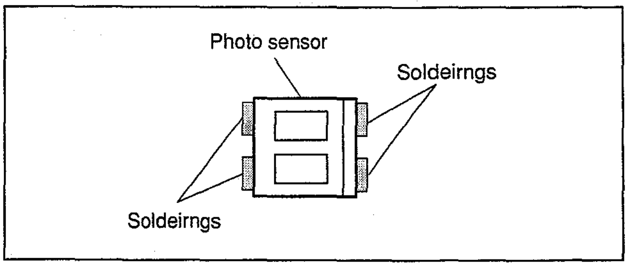


Photo sensor
Soldeirngs
Soldeirngs

1-26. Circuit Descriptions

1-26-1. CCD Block (TG-227 Board, PS-614 Board, PA-271 Board, and VA-208 Board)

TG-227 Board

The CCD drive pulses and the CCD output sample-hold pulse are generated by IC8 and IC111, and are then sent to the PA-271 board. At the same time, the black and white shading correction signals are generated by IC111 and are sent to the VA-208 board. These pulses are generated from the 36 MHz clock coming from the PS-614 board and are output in synchronization with the HD and VD signals supplied from the DCP-35 board. The 18 MHz clock is generated by IC8 using the HD signal as the frequency-division reset signal, and is sent to the DCP-35 board. The TG-227 board contains the optical filter interface circuit.

PS-614 Board

The PS-614 board contains the power regulator circuit that regulates the power used in the TG-227 board and the PA-271 board. It also contains the VCO X1 generating the camera reference clock, the amplifier and the buffer circuits that amplify and buffer the shading correction signal and the TEST SAW signal supplied from the TG-227 board. IC5 is an EEPROM that stores the CCD Vsub voltage.

PA-271 Board

The PA-271 board contains the power driver that power-amplifies the CCD drive pulse supplied from the TG-227 board so that the drive pulse can drive the CCD image directly. (IC5] H driver, IC9 and IC10: V driver) The PA-271 board has the function of separating the video signal from the CCD imager output signal using the co-related double-sampling. The output video signal is amplified to the doubled amplitude and is sent to the VA-227 board. The PA-271 board has the function to convert the board temperature to the voltage data using the temperature sensor (IC11) and its output is sent to the AT-143 board.

VA-208 Board

The video signal supplied form the PA-271 board is amplified and receives the various processing such as black shading correction, gain-up control, blanking cleaning, white shading correction, feedback clamp, flare correction and white balance. Selection of signal between the video signal and the TEST SAW signal is also performed by this board.

1-26-2. Camera Processing System (DCP-35 Board)

The DCP-35 board consists of the following blocks: The block that A/D-converts the analog RGB output signal from the CCD imager, the camera DSP block that performs the various signal processing, the driver block that sends the various D/A-converted analog signals to the respective outputs and the I/F block that interfaces with the AT-143 board.

The analog RGB signal that is input from the CCD block, passes through the pre-filter (FL-200 to FL-202), is converted to the 12-bit digital RGB signal with 18 MHz rate by the A/D converter (IC310 to IC312) and is sent to the camera signal processor IC (IC315).

In the camera signal processor IC (IC315), average value and peak value of the RGB video signals to be used for the automatic control systems of the camera such as auto black balance, auto white balance, auto iris and others. The detected average value and peak value are sent to the AT microprocessor on the AT-143 board.
The video signal polarity-inversion function and the 25/30PsF conversion function are realized here using the SDRAM (IC306 and IC329).
The main line video signal passes through the 1H delay line for generating the V detail signal, is up-converted to 36 MHz signal, is added of the matrix signal and the detail signals and receives the various processing such as pedestal level control, gamma correction, knee correction and white clip. After passing through the selector circuit that selects either the video signal or the color bar signal, the main line video signal receives the digital ENC processing so that it is output from the camera signal processor IC (IC315) as the digital VBS signal. The digital Y signal for VF and the 4:2:2 digital component signal are output from this IC at the same time.

The digital VBS signal and the digital Y signal for VF that are output from the camera signal processor IC (IC315) are converted to the analog VBS signal and the analog VF signal by the D/A converter (IC421 and IC402). The analog VBS signal takes two paths: One path goes to the VIDEO OUT terminal while the other output is mixed with the character signal and the marker signal. The mixed signals feed the TEST OUT terminal respectively. The analog VF signal is mixed with the character signal and is ountput to the VF terminal after passing through the selector circuit (IC513) that selects either the video signal input at the GENLOCK terminal or the RET signal when CCU is connected. The camera processing IC contains the sync separator circuit and the PLL circuit that are used to synchronize the camera system with the external input video signal at the GENLOPCK IN terminal.

The average value and the peak value of the video signal that are detected by the camera signal processor IC (IC315) are set on the 8-bit data bus and sent to the AT microprocessor on the AT-143 board.
Various control signals are generated and controlled by the AT-143 board via I/O expander (IC12, IC13, and IC105).

All of the variable resistors and potentiometers are no more used so that all of the signal level adjustments are performed electronically. This camera uses the electronic signal level adjustment system that adjusts the signal level using the setup menu.

1-26-3. Video Signal System (DVP-20 Board)

(1) Board No. Suffix -14 and Higher

- Signal processing during recording

The 27 MHz 10-bit Y-, Pb- and Pr-signals that are supplied from the video circuit of the DCP-35 board to the DVP-20 board, pass through the VIOLA (IC200) where these signal receive the video processing such as TBC processing and setup removal (in the case of external input signal in the NTSC mode), and then sent to the MPEG encoder IC MIKE (IC401) via PLD (IC208) where video signal data equivalent to a single frame is stored in the SDRAM (IC402) that is externally connected.
When the picture data as much as one frame data is stored, the picture data is converted to the MPEG format data by MIKE (IC401) and SDRAM (IC402) and is sent to the "B" port of MFC (IC601). The MPEG format data is converted by MFC (IC601), to the signal format to be recorded on tape and is sent to EVE (IC715) from the "D" port as the data 16-bit stream.
The main input data to EVE (IC715) are as follows.

- Video data that is already converted to the bit stream data.
- Audio data from the FP-121A board.
- Audio Auxiliary data (emphasis data, sampling frequency information, etc.)
- Video Auxiliary data (color sequence, video edit flag, etc.)

The audio Auxiliary data and the video Auxiliary data are sent the recording register inside the EVE via the CPU bus in the DVP board. EVE (IC715) has the function of generation and addition of outer code for data error correction, addition of SYNC/ID code and creation of SYNC block.
The 2-channel recording signal and 45.7 MHz clock are sent from the EVE to the RF system of the EQ-88 board together with the enable flag that indicates the validity range of the signal in accordance with the EQ_ENC_CTRL that is supplied to EVE from the EQ-88 board.

- Signal processing during playback

The playback data that is supplied from the RF system circuit of the EQ-88 board, is sent to the Error Correction Code (ECC) decoder IC ADAMHS (IC802) via the BUS SW (IC803). ADAMHS (IC802) corrects the errors that are contained in the input signal using the outer code. The error corrected signal is output to the "A" port of MFC (IC601) via PLD (IC618). If there are errors that could not be corrected by the error correction circuit, the error flag is set and is sent to MFC (IC601).
The playback audio signal is sent to the FP-121A board from ADAMHS (IC802).
The playback video signal is error-corrected and converted back to the MPEG format data by MFC (IC601) and is sent to the MPEG decoder IC DENEB (IC501) from "E" port via BUS SW (IC502). DENEB (IC501) and SDRAM (IC504) decode the MPEG signal as much as one frame data that is read out at the timing that is in phase with the video output signal. The decoded data is sent to the video process IC VIOLA (IC200) using the 10-bit width bus. DENEB (IC501) runs in the power saving mode that suppresses its power consumption.
VIOLA (IC200) performs the video processing and addition of EAV/SAV.
When the DCP_H_DVP_V_OUT signal that is supplied from the DCP-35 board goes high, PSDI2 of VIOLA (IC200) enters the output mode that supplies the output signal to the DCP-35 board via BUS buffer (IC207).

- Clock signal and timing reference signal processing

Only the 27 MHz clock signal is used in the signal processing circuit of the DVP-20 board during the recording and playback modes. The 27 MHz reference clock (DCP_DVP_VCK) that is supplied from the DCP-35 board is distributed to each IC and the CA board after phase compensation with the clock buffer (IC325 and IC326).
The timing signals are generated by TG (IC303) for the respective ICs, from the CF pulse (DCP_DVP_CF) and HD (DCP_DVP_HD) that are supplied from the DCP-35 board. However, the timing signal for EVE (IC715) is generated by VIOLA (IC200) that receives CF from TG and regenerates it.

(2) Board No. Suffix -13, -12

- Signal processing during recording

The 27 MHz 10-bit Y-, Pb- and Pr-signals that are supplied from the video circuit of the DCP-35 board to the DVP-20 board, pass through the VIOLA (IC200) where these signal receive the video processing such as TBC processing and setup removal (in the case of external input signal in the NTSC mode), and then sent to the MPEG encoder IC SX_ENC (IC401) via PLD (IC208).
The MPEG encoder IC consists of SX_ENC (IC401) and SX_M (IC403).
SX_ENC (IC401) stores the 10-bit input picture data as much as one frame data in the SDRAM (IC402) that is externally connected.
When the picture data as much as one frame data is accumulated, the picture data is compressed by SX_ENC (IC401) and SDRAM (IC402) in compliance with the MPEG format compression.
The compressed data is sent to SX_M (IC403) as the 8-bit stream containing sync signal, where the data is converted to the MPEG format data that is sent to the "C" port of MFC (IC601). The MPEG format data is converted by MFC (IC601), to the signal format that suits for recording on tape and is sent to EVE (IC715) from the "D" port as the data 16-bit stream.
The main input data to EVE (IC715) are as follows.

- Video data that is already converted to the bit stream data.
- Audio data from the FP-121A board.
- Audio Auxiliary data (emphasis data, sampling frequency information, etc.)
- Video Auxiliary data (color sequence, video edit flag, etc.)

The audio Auxiliary data and the video Auxiliary data are sent the recording register inside the EVE via the CPU bus in the DVP board.
EVE (IC715) has the function of generation and addition of outer code for data error correction, addition of SYNC/ID code and creation of SYNC block.
The 2-channel recording signal and 45.7 MHz clock are sent to the RF system of the EQ-88 board together with the enable flag that indicates the validity range of the signal in accordance with the EQ_ENC_CTRL that is supplied to EVE from the EQ-88 board.

- Signal processing during playback

The playback data that is supplied from the RF system circuit of the EQ-88 board, is sent to the Error Correction Code (ECC) decoder IC ADAMS (IC802) via the BUS SW (IC803).
ADAMS (IC802) corrects the errors that are contained in the input signal using the outer code. The error corrected signal is output to the "A" port of MFC (IC601) via PLD (IC618). If there are errors that could not be corrected by the error correction circuit, the error flag is set and is sent to MFC (IC601).
The playback audio signal is sent to the FP-121A board from ADAMS (IC802).
The playback video signal is corrected of its error and is converted back to the MPEG format data by MFC (IC601) and is sent to the MPEG decoder IC HLDEC (IC500) from "E" port via BUS SW (IC501). HLDEC (IC500) and SDRAM (IC502, IC503, IC504) decode the MPEG signal as much as one frame data. The decoded data is sent to the video process IC VIOLA (IC200) using the 10-bit width bus as the video signal.
The output signal from HLDEC has almost the same signal phase as that of the video output signal. HLDEC (IC500) runs in the power saving mode that suppresses its power consumption.
VIOLA (IC200) performs the video processing and addition of EAV/SAV.
When the DCP_H_DVP_V_OUT signal that is supplied from the DCP-35 board goes high, PSDI2 of VIOLA (IC200) enters the output mode that supplies the output signal to the DCP-35 board via BUS buffer (IC207).

- Clock signal and timing reference signal processing

Only the 27 MHz clock signal is used in the signal processing circuit of the DVP-20 board during the recording and playback modes. The 27 MHz reference clock (DCP_DVP_VCK) that is supplied from the DCP-35 board is distributed to each IC and the CA board after phase compensation with the clock buffer (IC325 and IC326).
The timing signals are generated by TG (IC303) for the respective ICs, from the CF pulse (DCP_DVP_CF) and HD (DCP_DVP_HD) that are supplied from the DCP-35 board. However, the timing signal for EVE (IC715) is generated by VIOLA (IC200) that receives CF from TG and regenerates it.

1-26-4. Audio System (FP-121A Board, IFA-11 Board, APR-59 Board, AL-43 Board, and AXM-24 Board)

The audio system consists of the following blocks:

- Front microphone block (IFA-11 Board)
- Signal switch block (FP-121A Board)
- CH1, CH2 manual control block (FP-121A Board)
- AGC and amplifier block for CH1 to CH4 (FP-121A Board)
- A/D converter block for CH1 to CH4 (FP-121A Board)
- Delay processing block (APR-59 Board)
- Monitor amplifier block (APR-59 Board)
- D/A and filter block (FP-121A Board)
- OUT_Limiter and amplifier block (FP-121A Board)
- Output stage amplifier block (AL-43 Board)
- Rear input block (AXM-24 Board)

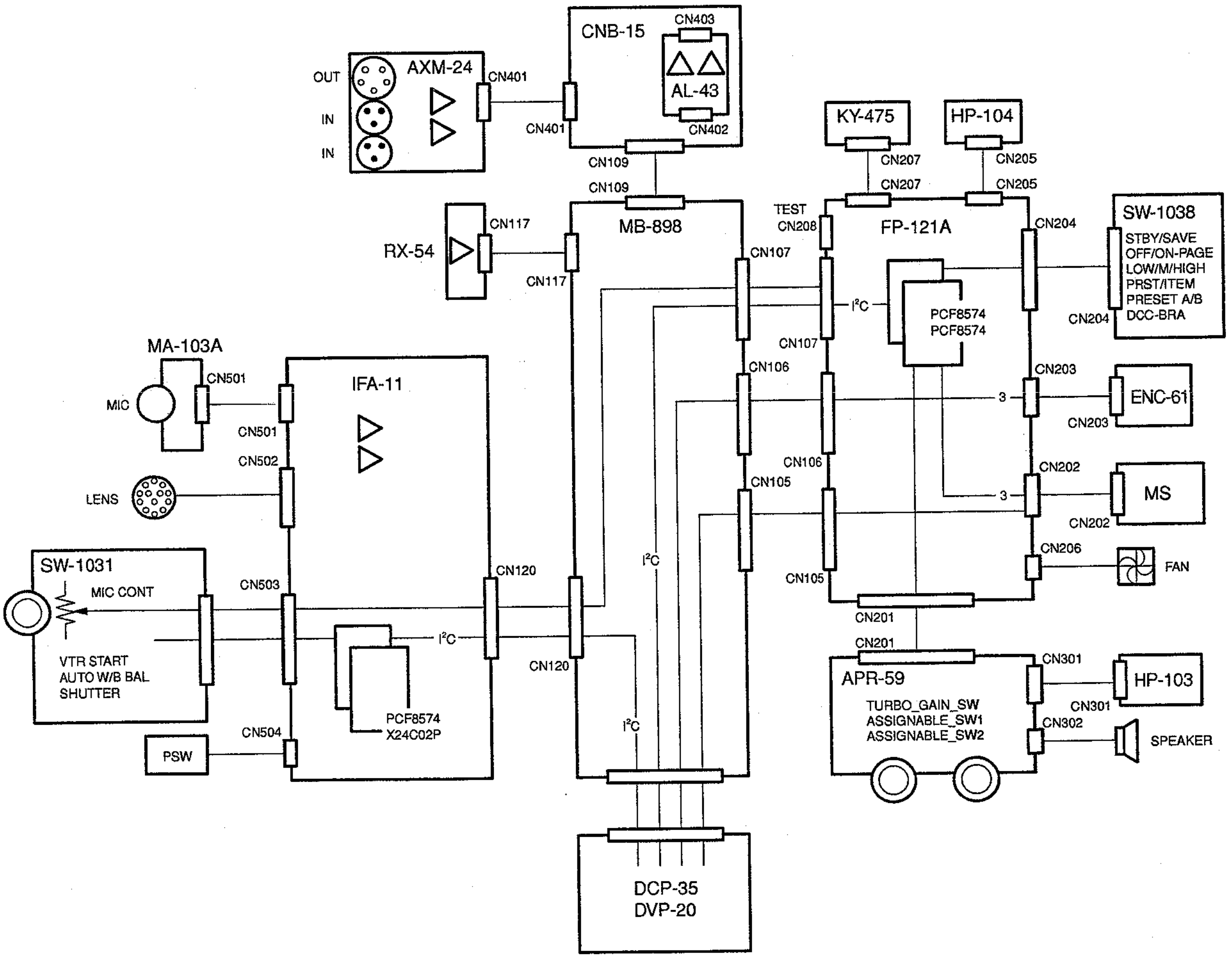

CNB-15
CN403
AL-43
CN402
AXM-24
OUT
IN
IN
CN401
CN401
CN109
CN109
MB-898
RX-54
CN117
CN117
MA-103A
MIC
CN501
CN501
IFA-11
CN502
LENS
SW-1031
MIC CONT
VTR START
AUTO W/B BAL
SHUTTER
CN503
PSW
CN504
PCF8574
X24C02P
I²C
CN120
CN120
I²C
I²C
CN107
CN106
CN105
KY-475
HP-104
CN207
CN207
CN205
CN205
TEST
CN208
FP-121A
CN107
I²C
PCF8574
PCF8574
CN106
CN105
CN204
SW-1038
STBY/SAVE
OFF/ON-PAGE
LOW/M/HIGH
PRST/ITEM
PRESET A/B
DCC-BRA
CN204
CN203
3
ENC-61
CN203
CN202
3
MS
CN202
CN206
FAN
CN201
CN201
APR-59
TURBO_GAIN_SW
ASSIGNABLE_SW1
ASSIGNABLE_SW2
CN301
HP-103
CN301
CN302
SPEAKER
DCP-35
DVP-20

Fig.1 Audio system, frame diagram

Audio control is accomplished by the FP CPU (IC801 : with built-in flash RAM) on the FP-121A board when it receives the audio mode information from the SS CPU (IC1) on the SS-92 board.
The IFA-11 board has the front microphone block (20 dB/30 dB) selector circuit that is fixed to the 20 dB position during the stereo mode.
The APR-59 board consists of the audio control IC (IC103), memory IC (IC104), and monitor amplifier block (IC106, IC109, ICQ101, IC102, etc.)
The AL-43 board constitutes the output amplifier stage (Q101, IC102, IC201, and IC202) that is connected to the CNB-15 board. Output signals of CH1 and CH2 are output from the 5-pin connector (CN301) on the AXM-24 board.
The AXM-24 board consists of the LINE-IN/MIC-IN/+4.8 V MIC-IN selector switch (S101 and S102), 3-pin input XLR connector automatic detection circuit (Q403 to Q407) and the microphone amplifier (30 dB) circuit.

When the main power is turned on, the FP CPU (IC801) on the FP-121A board receives the initialization of the respective ports, the locking information of the TG (IC200) PLL circuit of the DVP-20 board from the SS CPU (C1) of the SS-92 board, and releases the reset of the audio control IC (IC103) on the APR-59 board and sets the register data. It finally releases the audio mute (so the analog EE sound can be monitored).

The front microphone signal passes through the MA-103A board, IFA-11 board and MB-898 board, and then enters the input signal selector block of the FP-121A board. (IC5 to IC8)
The rear input signal passes through the AXM-24 board, CNB-15 board and MB-898 board, and then is sent to the input signal selector block of the FP-121A board (IC5 to IC8).
The FP CPU (IC801) on the FP-121A board obtains the switch position information of the FRONT/REAR/WIRELESS selector switch by reading the 2-bit signal of each switch (S1 to S4) as it selects the LINE SELECT (IC16) switch. In accordance with the obtained switch position information of FRONT/REAR/WIRELESS, the FP CPU (IC801) selects the desired audio signal by driving the input signal selector block (IC5 to IC8).

The CH1 and CH2 audio signals that are selected by the input selector block (IC5) of the FP-121A board are sent to the VCA block (IC12 and IC14) via a differential amplifier (IC1 : balanced/unbalanced conversion).
The output signal from the VCA block (IC12 and IC14) passes through the 10 dB ATT (IC108) and is sent to the manual controlled amplifier (20 dB) and the AGC amplifier (32 dB).
The amplifier outputs are selected by the AUTO/MANUAL selector switch (S101), pass through the balanced/unbalanced conversion amplifier (IC105) for A/D conversion and are sent to the A/D CONVERTER (IC106 : 20-bit digital output). The output signal of the A/D converter passes through the digital selector switch (IC102) of the APR-59 board, and is sent to the audio control IC (IC103 : AD1).
The CH3 and CH4 audio signals that are selected by the input selector block (IC7) of the FP-121A board, are attenuated by about −12 dB in the differential amplifier (IC2 : balanced/unbalanced conversion), pass through the 10 dB ATT (IC405) and are sent to the AGC controlled amplifier (32 dB).
The output signal from the AGC controlled amplifier (32 dB) passes through the balanced/unbalanced conversion amplifier (IC304) for A/D conversion and is sent to the A/D CONVERTER (IC305 : 20-bit digital output). The output signal of the A/D converter passes through the digital selector switch (IC102) of the APR-59 board, and is sent to the audio control IC (IC103 : AD2).
The 20-bit digital audio signal that is delayed by the audio control IC (IC103) of the APR-59 board, is output from the audio control IC (IC103 : ENC), passed through the MB-898 board and is sent to the DVP-20 board.
The output signal from the A/D CONVERTER (IC106 and IC305) on the FP-121A board is a 20-bit signal while the CA adapter output signal is a 16-bit signal. Due to this difference, these two signals are selected within the audio control IC (IC103) of the APR-59 board. The audio playback signal is supplied with the 20-bit signal that is converted to the 16-bit signal internally and is then output.
The output frequency and level of the test tone that is generated by the audio control IC (IC103), are fixed at 1kHz and −20dBu (fixed).
The IN/OUT signal diagram of the audio control IC (IC103) of the APR-59 board is shown in Fig. 2.

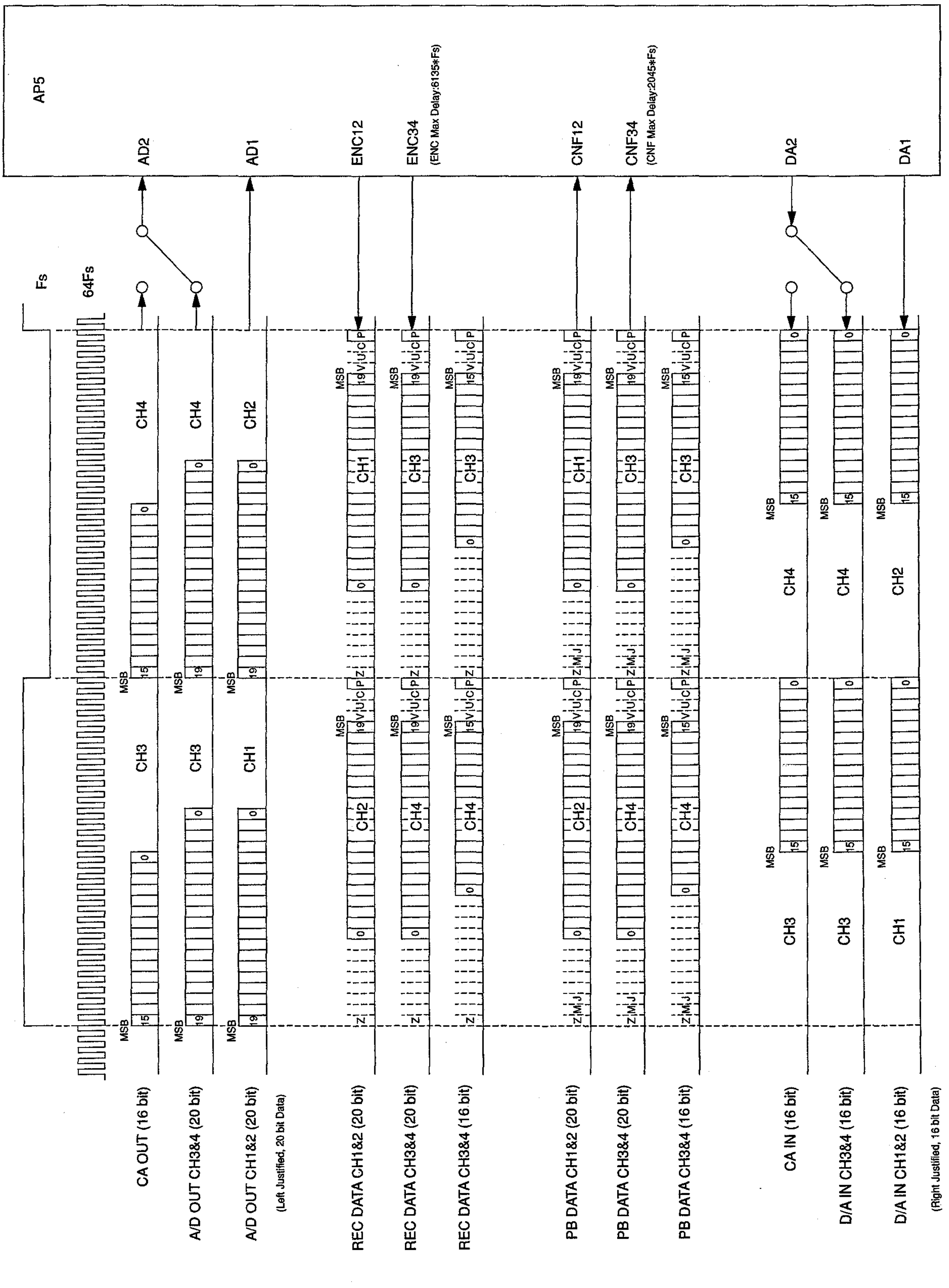
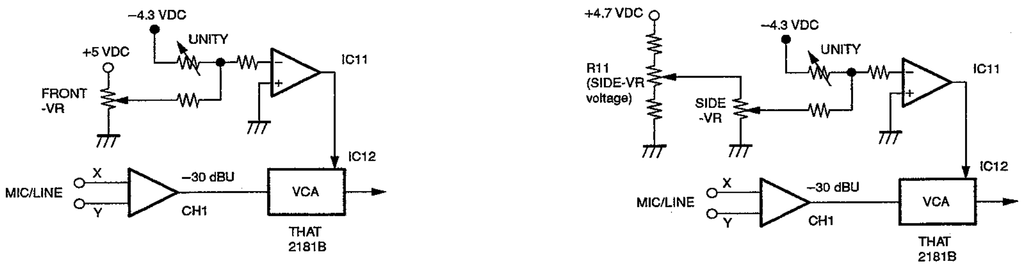

AP5
AD2
AD1
ENC12
ENC34
(ENC Max Delay:6135*Fs)
CNF12
CNF34
(CNF Max Delay:2045*Fs)
DA2
DA1
Fs
64Fs
CH1
CH2
CH3
CH4
MSB
15
19
0
V U C P
Z M J
CA OUT (16 bit)
A/D OUT CH3&4 (20 bit)
A/D OUT CH1&2 (20 bit)
(Left Justified, 20 bit Data)
REC DATA CH1&2 (20 bit)
REC DATA CH3&4 (20 bit)
REC DATA CH3&4 (16 bit)
PB DATA CH1&2 (20 bit)
PB DATA CH3&4 (20 bit)
PB DATA CH3&4 (16 bit)
CA IN (16 bit)
D/A IN CH3&4 (16 bit)
D/A IN CH1&2 (16 bit)
(Right Justified, 16 bit Data)

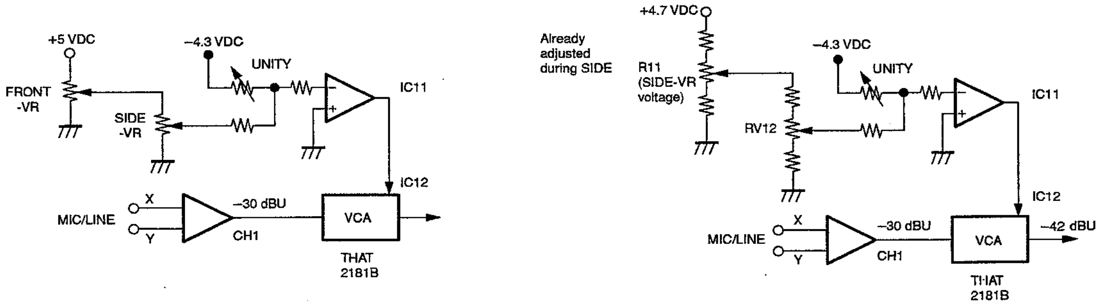
Fig. 2 IN/OUT signal diagram of IC103 (APR-59 board)

The combination of audio volume controls of the VCA block are specified using the menu (excluding AGC).
The control voltages for VCA that are supplied from the FRONT VR control, the SIDE VR control or the AGC-VR control are selected by the analog switch (IC101 and IC201) on the FP-121A board. The selected control voltage for VCA is supplied from IC11 to VCA (IC12 : THAT2181B) or from IC15 to VCA (IC13). The variable control range of the audio gain is from 0 dB to −∞ dB.


(1) FRONT VR control only
(When FRONT is selected by the maintenance menu
07 : VTR MODE-2 REAR 1 (or 2) WRR VR SEL)

(2) SIDE VR control only
(When S1 (or S2) is selected by the maintenance menu
07 : VTR MODE-2 REAR 1 (or 2) WRR VR SEL)

−4.3 VDC
+5 VDC
UNITY
IC11
FRONT -VR
IC12
X
Y
MIC/LINE
−30 dBU
CH1
VCA
THAT 2181B
+4.7 VDC
−4.3 VDC
UNITY
R11 (SIDE-VR voltage)
SIDE -VR
IC11
IC12
MIC/LINE
X
Y
−30 dBU
CH1
VCA
THAT 2181B


(3) FRONT VR control + SIDE VR control
(When F+S1 (or 2) is selected by the maintenance menu
07 : VTR MODE-2 REAR 1 (or 2) WRR VR SEL)

(4) AUTO
(When AUTO is selected by the maintenance menu
07 : VTR MODE-2 AU SG (1 kHz))

+5 VDC
−4.3 VDC
UNITY
FRONT -VR
SIDE -VR
IC11
IC12
MIC/LINE
X
Y
−30 dBU
CH1
VCA
THAT 2181B
+4.7 VDC
Already adjusted during SIDE
R11 (SIDE-VR voltage)
RV12
−4.3 VDC
UNITY
IC11
IC12
MIC/LINE
X
Y
−30 dBU
CH1
VCA
−42 dBU
THAT 2181B

Fig.3 Block diagram, combinations of VR controls

The playback signal passes through the DVP-20 board, MB-898 board and IC101 and the audio control IC (IC103 : CNF1) of the APR-59 board, and is output from the audio control IC (IC103 : DA1) as the 16-bit serial signal for D/A.
The 16-bit serial signal for D/A is sent to the monitor channel selector switch (S106) on the FP-121A board that drives the digital switch (IC105) in order to select either one of CH1, 2 or CH3, 4 or CA3, 4.
The selected monitor signal is sent to the 16-bit D/A CONVERTER (IC521) on the FP-121A board.
The selected monitor signal passes through the differential amplifier (IC504, IC505 : balanced/unbalanced conversion), T-type twin filter block (Q503 to Q506), amplifier (IC506), analog switch (IC507 : EE sound/playback sound selector), OUT_Limiter and amplifier block (IC512 and IC513), balanced/unbalanced conversion amplifier (IC514), MB-898 board, CNB-15 board and output stage amplifier (IC101) of the AL-43 board. It is finally output from the 5-pin XLR connector on the AXM-24 board.

1-26-5. System Control (FP-121A Board and SS-92 Board)

FP-121A board

The FP-121A board has the FP CPU (IC801 : with built-in flash RAM) as the sub system control for VTR.
The FP CPU (IC801) performs the following processes.

- Communication with the VTR main CPU (IC1 : SS CPU) on the SS-92 board

The FP-121A board and the SS-92 board are connected via the MB-898 board. The FP CPU (IC801) and the SS CPU (IC1) on the SS-92 board are connected by the clock signal synchronous-type serial communication once in every field at the frequency of about 500 kHz. The clock signal is a fixed length of 57 bytes. The SS CPU (IC1) is used as the master clock generator.

- Audio mode control

Audio control is performed by receiving the audio mode information and the menu setup information from the SS CPU (IC1) on the SS-92 board. The port of the FP CPU (IC801) is used as the input port and the switch information that is required for the audio mode control is input to this port. The control output is output from the latch IC (IC820 to IC826) of the FP CPU (IC801).

- Audio control IC

The following processes are performed by establishing serial communication with the audio control IC (IC103) of the APR-59 board.

  - Switching of the digital bus
  - Audio level detection
  - ON/OFF control of the internal signal generator
  - Audio delay control

The block has a circuit configuration that can isolate the bus to enable the FP CPU (IC801) to operate even when the main power is turned off.

- AUDIO level indication

The audio level information is supplied from the audio control IC (IC103) of the APR-59 board, and is sent to the SS CPU (IC1) of the SS-92 board. It has the data size of 16 bits × 4CH. The SS CPU (IC1) performs soft processing such as peak detection of the 16-bit data and creates the audio level indication data that is sent to the FP CPU (IC801). The FP CPU (IC801) displays the audio level on the LCD at every serial communication event.

- CTL/TC/UBIT display

The ON/OFF information of the switches that are connected to the port is scanned and sent to the SS CPU (IC1) of the SS-92 board. The SS CPU (IC1) changes the display data in accordance with the setting conditions, and the display data is sent to the FP CPU (IC801). The FP CPU (IC801) displays the received data at every serial communication event.
The FP CPU (IC801) only sends the switch information to the SS CPU (IC1), and does not create the display data.

- Watch IC control

The watch data is read from the watch IC (IC809 : EEPROM) of the FP-121A board, and is sent to the SS CPU (IC1) of the SS-92 board. The SS CPU (IC1) sends also the time data to the camera CPU (IC27) of the AT-143 board. The viewfinder uses the time data for displaying the time. When the time of the watch is set with the use of the menu, a set of data, a year, month, day, time and minute, is sent to the FP CPU (IC801) in the reverse route. At the same time, the time setting request is issued from the SS CPU (IC1). The FP CPU (IC801) sets the time to the watch IC (IC809) and confirms the data.

- WARNING LED control and alarm tone control

The WARNING information is supplied from the SS CPU (IC1) of the SS-92 board that is used to turn on and off the WARNING LED (D815) on the FP-121A board. The 1 kHz square wave output from the PWM generator circuit inside the FP CPU (IC801), is used as the alarm tone and is output from the FP CPU (IC801 : pin-27).

- Connection circuit with the wireless receiver (optional equipment)

The RS-232C TRANSCEIVER (IC817) on the FP-121A board acts as the interface circuit for connection with the wireless receiver. The FP CPU (IC801) performs the serial communication when the optional wireless receiver is installed, and reads the reception RF sensitivity and muting information. This data is sent to the camera CPU (IC27) via the SS CPU (IC1) on the SS-92 board so that it can be viewed on the viewfinder.

- Software download function

The FP CPU (IC801) is a CPU with built-in flash memory that enables rewriting of software.
To rewrite the software, the software that is saved in a memory stick is read by the camera microprocessor and is transferred to the FP CPU (IC801) via the SS CPU (IC1) for rewriting. The FP CPU (IC801 : pin-4) goes “H” during rewriting to release the WRITE INHIBIT.

The FP-121A board contains the power supply control circuit and the automatic insertion detection circuit for the REAR XLR connector.

- Power supply voltage measuring circuit

The power supply voltage measuring circuit (IC811 and IC812) uses the DA output data from the FP CPU (IC801). The two types of DC signal are output from the DA of the FP CPU (IC801), and are used to change the voltage at IC811 (pin-6) of the FP-121A board so that the voltage measurement ranges are switched between the range of +9 V to +14 V, and the range of +12 V to +17 V. The result of the voltage measurement is sent to the SS CPU (IC1) in the form of a voltage value where the remaining amount of battery and remaining data for display are calculated by the SS CPU (IC1) on the SS-92 board. The created data is sent back to the FP CPU (IC801). The FP CPU (IC801) shows the remaining data at every serial communication event.

- PWM power supply circuit for FAN/FP circuit

The PWM control loop (Q813: Open Loop) precisely controls the supply voltages by using the switching power supply circuit. Because the voltage input at the primary circuit of the power supply circuit is supplied from battery, the input voltage changes significantly. Because of the significant change of input power voltage, the cycle of the PWM signal is changed in accordance with the result of battery voltage measurement so that the FAN power supply voltage is kept constant. The camera CPU (IC27) of the AT-143 board that measures the CCD temperature also determines the FAN control voltage. It sends the commands through the SS CPU (IC1).

The switching circuit of the PWM circuit is shared so that it can act as a power supply circuit for the FP microprocessor (so that the FP CPU (IC801) can work during power-off) and the power supply circuit for the peripheral circuits. The consumption current is reduced so that the +6 V power is first generated by the PWM circuit. After that, the series regulator circuit is activated. When the main power is turned on, the +5 V power from MB-898 is sent to the input circuit of IC805 to IC807 of the FP-121A board. When the main power is turned off, +6 V power is input. The output signal from IC805 and the diode D809 are connected as an OR gate so that the power supply of +5 V-2 is supplied all the time.

The output signal from CN107 (pin-38) of the FP-121A board is used to drive the fan. The FP CPU (IC801) can operate during power-off from the power supplied from CN107 (pins-39, -40) of the FP-121A board.

- Soft control circuit at power-off

The FP CPU (IC801) detects the switch information. Only when the FP CPU (IC801) and the SS CPU (IC1) of the SS-92 board become ready to turn off, the main power can be turned off. The FP CPU (IC801: pin-90) accepts the input signal from the POWER switch. The FP CPU (IC801: pin-91) supplies the output signal for power-off. Only when this signal and the H_POWER_HOLD (IC801: pin-91) signal goes “L”, the main power can be turned off. However, the main power can be turned on simply by turning the POWER switch ON.

- FP CPU backup circuit

The FP CPU (IC801) is connected to a coin battery so that the data in the internal RAM is kept saved even after the power is turned off. By saving the system data, the FP CPU (IC801) can start up very quickly when the power is turned on.

IC802, IC808 and IC841 on the FP-121A board are identical +2.5 V threshold voltage detector ICs. Because IC802 has resistors R803 and R804, the detection voltage is +3.05 V. Since IC808 has the delay circuit consisting of R983 and C842, detection by IC808 is delayed after IC841. The delay of detection is used as follows. A drop in the voltage that is supplied to the CPU is detected by IC802 first and the processing to enter the STANDBY mode finishes. Next, IC841 creates the hardware STANDBY state (clock signal stops). Lastly, the FP CPU (IC801) enters the reset state by IC808 waiting for the next power-on. When the power is turned on, the STANDBY is released, the clock signal oscillation starts and then reset is released.

- Backup lithium battery voltage measurement circuit

The FP CPU (IC801) measures the output voltage of the backup lithium battery BT101 (BP-33 board). When the battery-end is detected, the low-voltage information is sent to the SS CPU (IC1) of the SS-92 board. Because this battery is used as the backup power for the watch IC (IC809) of the FP-121A board, measurement is performed at the low rate of once every minute to reduce battery consumption together with the FET switch (Q804).

- Independent operation of FP CPU (IC801)

The power supply circuits are grouped so that the FP CPU (IC801) can be operated even after the main power is turned off. The power supplies of +3 V, +3.2 V, +5 V-2 are supplied from UNSW +12 V even after the main power is turned off.

- Automatic insert detection at the REAR XLR connectors

The LED drive signal that is used for the automatic insert detection at the REAR XLR connectors, is supplied from CN107 (pin-26) of the FP-121A board, and is sent to the AXM-24 board. The return signal from the photo sensor on the AXM-24 board is input to CN107 (pin-28, pin-29) on the FP-121A board. When the detection is set to ON by the menu setting (section 4-6: MAINTENANCE menu, VTR-MODE1 display: REAR XLR AUTO), the REAR XLR input is selected regardless of the position of the AUDIO IN SELECT switch.

SS-92 board

IC1 is SS CPU, and the ROM (IC8 : FLASH MEMORY) program is developed to the SDRAM (IC6, IC33) and the following processes are executed on a RAM basis.
At the same time, the system control can be started from the external ROM through CN3.

- Connection with EEPROM

The EEPROM (IC403) on the MDC-13A board is connected to the SS CPU (IC1 : 28_SITXO to 30_SICKO) using synchronous serial communication. Various hours meter data and servo adjustment values are saved in the EEPROM (IC403).

- Connection with the DVP-20 Board (Video Processor Control)

The DVP-20 board is controlled mainly by the address bus and the data bus that are shared with the ROM (IC8) and SDRAM (IC6 and IC33).
Selection of the respective IC chips is performed by decoding the address of A2 to A8. Data to the respective ICs is sent with the common use of 8 bits of D0 to D7. The communication method is the clock synchronous type and the clock signal is output from the SS CPU (IC1 : 31_HCLK) via IC10. IC11 and IC12 are used for the communication timing signal and for the PIO control. In addition to the above signals, the following signals are used for connecting the SS-92 board with the DVP-20 board.

- Input, Reference of the frame signal : CN102 pin-49
- Input, Reference of the color framing signal : CN102 pin-48
- Output, Frame pulse for ADAM-s : CN102 pin-40
- Output, Frame pulse for ADAM-s : CN102 pin-39

- Asynchronous serial communication

The SS CPU (IC1) has three asynchronous serial connection channels.

- GPS unit connection : (20_TXD1, 22_RXD1)
- PC debug monitor connection : (25_TXD0, 27_RXD0)
- Remote control connection : (32_TXD3, 33_RXD3)

The remote controller is connected to the 8-pin REMOTE terminal and is sent to the SS-92 board via the AT-143 board.

- Synchronous serial communication

The SS-92 board has two groups of synchronous serial communication that are used to establish communication with the total five blocks.

1) Connection with AT-143 board and FP-121A board (IC1 : 214_SIN1, 215_SOUT1, 216_SCK1)
   Connection with the camera block is performed through the AT-143 board. Connection of the audio data, the LCD display data, and the POWER ON/OFF related data, is performed through the FP-121A board. Selection of communication is performed by CN102 (pin-28, pin-101) of the SS-92 board. The following signals are supported by connection with the FP-121A board after passing through CN102.
   - Output, Reference of frame signal : pin-103
   - Output, SS RESET signal : pin-104
   - Output, For rewriting the FP CPU ROM : pin-107
2) Connection with EQ-88 board and CCM-45 board (IC1 : 278_SIN3, 279_SOUT3, 280_SCK3)
   The REC/PB control is supported by the communication with the EQ-88 board. The Read/Write control of the FL-283 printed wiring board (Tele-File) is supported by the communication with the CCM-45 board. Selection of communication is performed by CN102 (pin-14, pin-125). In addition, this serial communication line is used also to write the Config data of FPGA (IC13) at power-on.

- KY-475 board control

The VTR operation switches (S1 to S5) and the display LEDs on the KY-475 board are connected directly with the SS CPU (IC1 : 65_PB15, 73_PB22) by parallel connection.

- Timecode

The timecode reader/generator that is built inside the SS CPU (IC1) is used. The recording LTC from the generator passes through IC13 and IC23 of the SS-92 board and is sent to the record amplifier (IC610, Q617 and Q618) of the MDC-13A board. The IC13 has the functions of buffering and muting during PB. It does not perform the 2-frame delay operation.
The IC32 of the SS-92 board is the selector switch that selects whether the PB timecode from the MDC-13A board is input to the TC reader of the SS CPU (IC1), or the delayed REC timecode during LOOP recording is input to the TC reader. The switch IC32 is used to generate the VITC signal during LOOP recording.
The IC16, IC17 and IC14 of the SS-92 board receive the external timecode that is input to the TC IN connector from an external source and waveform-shapes it before sending it to the SS CPU (IC1).
The IC19 on the SS-92 board is the output circuit of the timecode OUT signal (REC TC/PB TC) that is supplied from the SS CPU (IC1) to feed the timecode signal to the TC OUT connector.

1-26-6. Servo Control System (SS-92 Board, MDC-13A Board, MDR-14 Board, and SE-613 Board)

Servo control is accomplished by the SS CPU (IC1) on the SS-92 board.
The MDC-13A board, MDR-14 board and SE-613 board have the motor drive circuit and sensor system circuits.

The SS-92 board and the MDC-13A board are connected by two flexible card wires (each 45 pins).
The signals of the MDR-14 board are connected with the SS-92 board via the MDC-13A board.
The MDR-14 board is connected with the drum motor and functions as a relay circuit board to transmit the signals coming from the drum motor and SS-92 board to the EQ-88 board.
The SE-613 board is also connected to the SS-92 board via the MDC-13A board.

SS-92 board

The respective servo circuits are controlled by the SS CPU (IC1) that performs the system control and the servo control of the VTR.
The SS CPU (IC1) contains the FG detection, PPG, PWM, PIO, and ADC modules that are required for the VTR servo control. Using these functions, the servo control and the creation of the output control signals are performed.
The drive voltages that drive the drum motor and the capstan motor are controlled by the PWM control circuit. The PWM output signals are converted to analog voltages and are sent to the MDC-13A board and to the MDR-14 board.
The FG and PG signals that are waveform-shaped in the MDC-13A board and the MDR-14 board are sent to the SS CPU (IC1) of the SS-92 board where the respective motors are controlled.
The capstan FG wave amplifier in the SS-92 board is used for the STOP servo circuit.
The CTL signal that is waveform-shaped for the capstan phase servo in the MDC-13A board is input to the SS CPU (IC1).
The loading motor is controlled by the three control signal lines (two lines of SS_LOADING_CONT and a SS_L_LOADING_SLOW) that detect the 4-bit position information data (MDC_FCAM) from the MDC-13A board.
In addition to the above signals, information from the various sensors is input to the SS CPU (IC1) and is used for various controls.

On the other hand, the various IC control signals are created specifically for the respective applications and supplied to the EQ-88 board and DVP-20 board.
The SS CPU (IC1) and the servo adjustment data storage EEPROM (IC403 : MDC-13A board) are connected by serial communication.

MDC-13A board

The MDC-13A board consists of the capstan FG waveform shaping circuit, capstan drive PWM driver amplifier, mechanism drive motor driver, CTL record/playback amplifier, LTC record/playback amplifier, full erase circuit, mechanism position sensor, cassette lock sensor, HUMID sensor circuit, and cassette ID switch.
The capstan FG waveform shaping circuit amplifies the output signal from the MR sensor of the capstan motor with the operational amplifier (IC201), adds an offset voltage at the comparator (IC202 and IC203), and then shapes its waveform to a rectangular wave.
The waveform shaping processing is performed by the comparator IC204 (1/4, 2/4) to generate the 4 times FG signal that is used inside the SS CPU (IC1) of the SS-92 board.
The capstan drive PWM driver amplifier consists of the PWM amplifier (PWM module IC (IC101) and switching FET (Q102)) and 3-phase motor driver (IC102).
The capstan drive PWM signal that is output from the SS CPU (IC1) of the SS-92 board is amplified by the driver and drives the capstan motor.
The CTL record/playback amplifier consists of the CTL amplifier (Q615 and Q616) for recording and the CTL playback amplifier (IC616 and IC617). During recording, the CTL signal that is generated by the SS CPU (IC1) of the SS-92 board is amplified to control the recording current flowing through the CTL head so that the CTL signal is recorded on tape. During playback, the CTL signal that is picked up from the playback amplifier is converted to a rectangular wave that is used for the capstan playback servo system that is controlled by the SS CPU (IC1) of the SS-92 board.
The mechanism position sensors are used to monitor the status of the VTR mechanism. The SS CPU (IC1) of the SS-92 board judges the status of the mechanism position.
The cam gear motor is controlled by the mechanism drive motor driver that consists of IC402. Thus the mechanism is controlled as described above.

The cassette lock sensor consists of the optical sensor of PH307 that sends the status of the cassette compartment as the mechanism information to the SS CPU (IC1) of the SS-92 board. The cassette ID switch consists of six push-switches (S301 to S305, S308). Output information of the cassette ID switch is sent to the SS CPU (IC1) of the SS-92 board as the cassette tape ID and other cassette information.
The HUMID sensor circuit consists of the HUMID sensor and the comparator (IC303). This HUMID information is sent to the SS CPU (IC1) of the SS-92 board.

MDR-14 board

The MDR-14 board consists of the drum drive PWM amplifier, the drum PG waveform shaping circuit and the FG waveform shaping circuit.
The drum motor drive PWM driver amplifier consists of the PWM amplifier (PWM module IC (IC2) and switching FET (Q1)) and the 3-phase motor driver (IC1). The drum motor drive PWM signal is supplied from the SS CPU (IC1) of the SS-92 board, amplified by this driver and drives the head drum motor.
The drum PG/FG amplifier consists of the PG/FG amplifier module IC (IC4). The FG/PG analog signal output from the drum motor is amplified by IC4, waveform-shaped to a rectangular wave and is sent to the SS CPU (IC1) of the SS-92 board that performs the servo control of the drum motor.

SE-613 board

The SE-613 board consists of the cassette-in sensor switch and the REC INHIBIT sensor switch. The switch information from these two switches is sent to the SS-92 board via the MDC-13A board.

1-26-7. RF System (EQ-88 Board)

- During record mode

The two channel standard-drum-diameter recording data in which ECC is added in the DVP-20 board, are converted to 8-channel data for the small diameter drum at the RING (IC201) and modulated into BI-PHASE signal at the REC driver (IC302, IC410). The output of the REC driver is sent to the head drum.
At the same time, the controls such as the record current control are implemented for the REC amplifier/PB amplifier inside the drum. The RF alarm detection is also performed by detecting the playback RF level.
The control signals for the drum are prepared as MPX data/clock signals by the MPX ENCODER (IC101), and are sent via the MDR-14 board to the drum board (UDR-32 board), where they are decoded by the MPX DECODER (IC3) and are supplied to the respective REC amplifiers and the PB amplifiers.

- During playback mode

The 8-channel playback RF signal is amplified and A/D-converted by the Read Channel (IC501, IC601, IC701, IC801, IC1501, IC1601, IC1701, and IC1801), and is output as 6-bit data.
After that, the 8-channel playback RF signal receives Viterbi decoding, sync signal detection, inner error correction and descramble at the EDEN (IC901 and IC1001). Then the data is output to the DVP-20 board.

- Setting and adjusting data

The RING (IC201) data, the Read Channel (IC501, IC601, IC701, IC801, IC1501, IC1601, IC1701, and IC1801) data and the EDEN (IC901 and IC1001) data are set by the EQ CPU (IC1101) that enables the complete automatic adjustment of the record RF system and the playback RF system.

1-26-8. Power Supply Systems (CNB-15 Board, RE-186A Board, and RE-187A Board)

CNB-15 board

This controls distribution of the input +12 V power to the respective circuit boards.

- Power ON/OFF Control

The L PWR SW ON signal enters IC107 of the CNB-15 board via the IFA-11 board and the MB-898 board that turns on Q107. As Q107 is turned on, the battery +12 V or the EXT DC IN +12 V is supplied to the respective circuits.
IC107 of this unit receives at the same time the H POWER HOLD signal from the FP-121A board after the main power of this unit is turned on. Therefore, Q107 is kept on even if the L PWR SW ON (L) signal is goes to OFF (H).
In order to turn off the main power of this unit, the H POWER HOLD signal must be opened and set to "L".
When the FP CPU (IC801) of the FP-121A board detects the POWER SW OFF, it waits for completion of the VTR operations if any VTR operations are in progress, and sets the POWER HOLD signal to "L" to turn off the main power of this unit.

- Protection from Excess Input Voltage

The VOLTAGE DETECT (IC101) monitors UN SW +12 V through D105. If the UN SW +12 V exceeds approximately +18 V, it outputs the PROTECT signal (L) from its pin-4 to turn off the +12 V power. (Except UN SW +12 V for the FP-121A board.)
This circuit does not have a latch function so that the power will be recovered immediately after the input power voltage returns to +18 V or less.

- Battery/EXT DC selection

The connector insert detection switch that is fitted with the EXT DC IN connector (XLR 4-pin) is used to select either battery or EXT DC input.
The output signal from this switch passes through IC103 to IC105 and is sent to the FET CONTROLLER (IC109) that finally selects ON/OFF of the FETs (Q110 to Q112 and Q114 to Q116 : ON when battery is in use, Q120 to Q125 : ON when EXT DC power is in use).
In this IC109, a step-up circuit (Vcc +8.5 V) that drives the N-CH MOS FET gate is employed.

- Excess current detection

The output circuit of the UNREG +12 V from the CNB-15 board has excess current detection resistors R142, R143 and R147. A voltage drop at the resistors is detected by the FET CONTROLLER (IC109). When the voltage drop at the resistors exceeds 200 mV, the power supply circuit enters the SHUT DOWN state.
Another SHUT DOWN signal is the H SHUT DOWN signal that is supplied from the RE-187A board. If any one of the DC-DC converter outputs is shorted, the power supply circuit enters the SHUT DOWN state except UN SW +12 V.
Since the FET CONTROLLER (IC109) on the CNB-15 board has a latch function, the power supply does not restore automatically. The main power of the unit needs to be turned off once and back on.

- Protection against input power connection of reverse polarity

If the input power is connected in reverse polarity, FET (Q101) is turned off so that the GND lines of the control system circuits are disconnected. Thus the control circuits are protected and supply of +12 V power to the respective circuits is stopped.

DC-DC converter

The DC-DC converter consists of two circuit boards, the RE-186A board and RE-187A board. Neither of these two boards can be operated independently.

- PWM clock signal

The PWM POWER CONTROL (IC202) on the RE-186A board generates the master clock signal (100 k ±10 kHz) for all of the controller ICs (IC101, IC202, IC301 on the RE-186A board and IC102, IC103 on the RE-187A board) and distributes it.

- Input voltage monitoring circuit

The RE-187A board has the input power voltage monitoring circuit (IC105). When the input power voltage stays within the specified range, the powers are supplied to the respective controller ICs (IC101, IC202, IC301 on the RE-186A board and IC102, IC103 on the RE-187A board).
The power supply circuit starts up when the input power voltage is within the range of +10.4 V to +18.8 V. Once the power supply circuit has started up, it keeps operating until the input power voltage decreases below the lower limit (+9.5 V).

- Protection circuit when output circuit is shorted

A diode or transistor is connected to the respective output circuits. They are reverse-biased during normal operation of the unit so that they are turned off.
However, if any single output circuit is shorted, or if the output power is not supplied due to any abnormality, the above diode or transistor and Q132 on the RE-187A board are turned on so that the H SHUT DOWN signal is output. The H SHUT DOWN signal stops sending the clock signal to the respective ICs and all of the power outputs are stopped.
The H SHUT DOWN signal is also sent to the FET CONTROLLER (IC109) on the CNB-15 board where supply source of the UNREG +12 V power is stopped.

- Voltage control circuit

The power supply circuits of +1.5 V, +1.8 V, +2.5 V, +3.3 V, +5 V and +9.3 V are step-down type chopper circuits.
The power supply circuits of −5 V and −10.5 V are inverted type chopper circuits. The power supply circuit of +46 V is a step-up type chopper circuit.
The power supply circuits of +15.5 V and +35 V are described as follows.
The primary winding of the transformer T101 of the RE-187A board not only functions as the coil (L) of the −10.5 V inverted type chopper, but is also used to step up its driving current by transformer coupling, and the stepped-up voltage is half-wave rectified to generate the above power voltage.
The output voltage is again DC-biased by +9.3 V to generate the powers of +15.5 V and +35 V.
The output power voltages of the above-described two power supply systems are not controlled by the controller IC, so the output voltages are stabilized by a series regulator consisting of Q128, Q129 and IC106.

1-26-9. Optional Boards (DIF-113 Board, MY-104 Board, and IV-55 Board)

Camera system optional board (DIF-113 board : MSDW-902)

The DIF-113 board receives the parallel 10-bit 4:2:2 video signal having sampling rate of 27 MHz and the serial digital audio signal (4 channels) having the sampling rate of 48 kHz from the DCP-35 board with IC14. These signals are converted to the 270 Mbps SDI signal with IC17 and are supplied to the VIDEO OUT connector on the rear panel. Q4, Q6 to Q11 and IC22 are the 75Ω driver of the SDI signal.
IC14 has the following functions.

- Inserting EAV/SAV to the parallel 10-bit 4:2:2 video signal.
- Timebase-compressing the serial digital audio signal (4 channels) of 48 kHz sampling rate and inserting it into the blanking period as the embedded audio signal of the SDI signal.
- Creating CRCC in order to support EDH.

The SDI signal that is converted by IC17 conforms to the 10-bit 4:2:2 component signal of SMPTE 259M standard.
At the same time, the DIF-113 board receives the analog VBS signal from the DCP-35 board. It switches between the analog VBS signal and the SDI signal. The switched output signal is supplied to the VIDEO OUT connector.
IC24 and Q12 are the 75Ω driver of the VBS signal.
When outputting the SDI signal, the sufficiently high impedance state is maintained by turning off Q12 so that the high frequency characteristics of the SDI signal are not adversely affected.
Switching between the SDI signal and the VBS signal is performed by the "OPERATION MENU" on the <OUTPUT SEL> page of REAR BNC SEL (SDI/VBS/OFF).

Video system optional board (MY-104 board : MSDW-903/ IV-55 board : MSDW-904)

MY-104 board : MSDW-903

This board has the function of loop recording and performs the following processes.
During the loop recording or the interval recording, the compressed video data that are supplied from the video system circuit of the DVP-20 board, and the audio data are converted to the data format that can be readily stored in the SDRAM, by LOOP MEMORY CONTROL (IC201). After the data format conversion, the video data are written into SDRAM (IC301 to IC304) and the audio data are written into MEMORY (IC309) sequentially. These data are read out at the required timing and are converted back to the original data format by LOOP MEMORY CONTROL (IC201). After the data format is converted back to the original format, the video data pass through the buffer (IC202, IC203) and the audio data pass through the buffer (IC204) and are supplied to the video system circuit of the DVP-20 board.

TC data are stored in the MEMORY (IC309) together with the audio data.
Read/write timing control of the SDRAM is performed by the commands that are output from the I/O EXPANDER (IC101). It is controlled by the system control circuit of the SS CPU (IC1) on the SS-92 board.

Clock of the SDRAM (IC301 to IC304) for the video data is the 54 MHz clock that is generated by the LOOP MEMORY CONTROL (IC201) by frequency-doubling the 27 MHz clock supplied from the video system circuit of the DVP-20 board. The 54 MHz clock that is thus generated is then distributed.
Regarding the clock of MEMORY (IC309) for audio data, the 12.288 MHz clock that is supplied from the video system circuit of the DVP-20 board, is supplied as the clock as it is.

IV-55 board : MSDW-904

This is the analog composite input board and contains the following four circuit blocks:

1) Analog video signal process block
2) Timing signal process block
3) Digital signal process block
4) Power supply block

1) Analog video signal process block
The analog video signal that is connected to the GENLOCK connector is terminated in 75Ω in the IO-202A board, and is sent to the IV-55 board via MB-898 board and DVP-20 board.
The analog video signal that is input to the IV-55 board is distributed to the two signal paths. One path goes to the timing signal process block while the other path goes to the AGC AMP (IC153) at −19 dB after passing through Q103, sync tip clamp by Q108, buffer (IC102) and low-pass filter (FL101).
The AGC-GAIN level is maintained to a constant voltage even when mode is switched between PAL and NTSC because the different AGC-LEVEL voltage is selected by switching the voltage diving resistors with IC155.
The AGC AMP (IC153) (amplifier with voltage gain control function CLC520) has the gain control range of ±6 dB. The gain is automatically controlled by the pedestal level DC voltage that is applied to AMP (IC154) and the AGC GAIN ADJ control (RV102).
The analog video signal that is output from the AGC AMP (IC153) is DC-clamped by the VIDEO AMP (IC104). This signal is maintained at the certain voltage level by the sync amplitude voltage supplied from the SYNC LEVEL AMP (IC116) and the clamp error voltage supplied from PIAS (IC301). This signal is sent to the IN1 terminal of the ANALOG VIDEO SW (IC107).
The IN2 terminal of the ANALOG VIDEO SW (IC107) receives the DC signal that is synthesized by the sync level and the pedestal level that are used to process the video signal. This signal is used to switch the sync portion and the back porch portion of the signal.
The analog video signal that is output from the ANALOG VIDEO SW (IC107) is amplified by the VIDEO AMP (IC108) having amplitude of DC2 V +2 V p-p (in case of 100%ì color bar), and is sent to the A/D CONVERTER (IC118). The reference voltage of the A/D CONVERTER (IC118) is Vrhf = 4 V and Vrlf = 2 V. Clock is 35.46895 MHz (8 fsc) and the signal is sampled to 10 bits.
The clock signal for NTSC and that for NTSC are switched and the switched clock is supplied. The phase comparator for PLL is located inside PIAS (IC301).

2) Timing signal process block
One of the analog video output signals that are distributed by the analog signal process block passes through Q103, low-pass filter (C107, C109, and L103) and buffer (Q104), and is supplied to the SYNC SEPARATOR (IC105) where it is separated into C SYNC (composite sync signal output) and V SYNC (V. sync) signals.
The C SYNC signal is distributed to the two output at the SYNC SEPARATOR (IC105). One output is used to generate the H. sync signal for sync tip clamp by IC132 (221A) and IC149 (123A), and is sent to Q118/Q110.
The other output is removed of its noise by C135/R142 and sent to IC122-1/3 (221A) and IC122-2/3 (221A).
IC122-1/3 (221A) generates the timing signal that is used to hold the sync level. IC122-2/3 (221A) generates the timing signal that is used to hold the pedestal level.
The sync-level-hold timing signal is sent to buffer (IC115) and SYNC LEVEL AMP (IC116) where it is compared with the clamp error voltage supplied from PIAS (IC301). Output of this comparison is fed back to VIDEO AMP (IC104) so that the sync level potential of the analog video signal is maintained. The sync level voltage is sent to the CH0 terminal of the switch (IC112).
The pedestal-level-hold timing signal maintains the pedestal level voltage of the analog video signal of VIDEO AMP (IC104), and is sent to the CH1 terminal of the switch (IC112) via buffer (IC116).
The timing signal that is generated by IC122-1/3 (221A), IC129-1/3 (123A) and IC149-2/3 (123A) is sent to the CONTROL terminal of the switch (IC112). The sync level voltage and the pedestal level voltage that are synthesized by the switch (IC112) are sent to the IN2 terminal of ANALOG VIDEO SW (IC107) vial buffer (IC115).
The sync level voltage and the pedestal level voltage that are added to the analog video signal, generate the level difference during the back porch when the signal is switched by the ANALOG VIDEO SW (IC107). In order to prevent the video signal from occurrence of the level difference, the PEDESTAL ADJ (RV104) must be adjusted to remove the level difference.
The control signal of the ANALOG VIDEO SW (IC107) is generated by the logic-OR gate between the output signal from IC129-1/3 (123A) and the output signal from the COUNTER (IC114 and IC117), IC147-1/2, IC150-2/3 and IC147-2/3.
The V SYNC (V. sync signal) from the SYNC SEPARATOR (IC105) is logic-ORed with OVD (Low) from PIAS (IC301) by IC316-2/3 (123A), IC318-1/2 (74F) and IC315-1/2 (32F). The OR gate output becomes DEC-VD.
The buffer (IC319), PLL (IC308), LPF (IC320), X303 and buffer (IC325) constitute the 27 MHz PLL circuit.
LPF/AMP (IC317), X301, X302, CLOCK SEL SW (IC305) and buffer (IC306) constitute the 35.46895 MHz and 28.637638 MHz PLL circuit that are used to switch either the PAL mode or the NTSC mode together with the switch Q301, Q303 (power supply) and CLOCK SEL SW (IC305).
The analog video signal coming from VIDEO AMP (IC104) is clamped of its pedestal level by LPF (C126, C129, and L106), Q104, buffer (IC125) and Q111.
After the pedestal-level clamp, center of the sync period is compared by the buffer (IC126) and COMPARATOR (IC111). The comparator output is provided as the composite sync signal.
The composite sync output signal from COMPARATOR (IC111) is sent to the ASYNC terminal of PIAS (IC301) as the analog sync signal. It is also sent to IC129 (123A) to generate the DELAY-SYNC signal for CF (color framing) detection.
Output from IC129 (123A) turns ON/OFF Q112, and is integrated by C180/R198 and then input to the −V terminal of COMPARATOR (IC119). The adjustment RV101 at the +V terminal end adjusts starting of the DELAY-SYNC signal This signal is logic-ORed with the analog sync signal and then sent to DCSY terminal of PIAS (IC301).
When the operating mode is switched to the NTSC mode, the RV105 is switched automatically by IC156, and RV105 adjusts the beginning of the DELAY_SYNC signal.

3) Digital signal process block
The 10-bit digital video signal from AD CONVERTER (IC118) is sent to EVAD (9 to 0) of PIAS (IC301) where this signal is read by the 8-fsc clock that is internally generated inside PIAS (IC301) and receives the decode processing. (Digital color difference signal)
The digital difference signal is sent to the digital video circuit of the DVP-20 board at the 27 MHz clock rate via buffer (IC303, IC304).
Various setups for PIAS (IC301) are executed by SS CPU (IC1) on the SS-92 board via CPU BUS after the main power is turned on.

4) Power supply block
While the equipment is not being operated, the power-saving is accomplished by turning ON/OFF the FET (Q101, Q109) using the Power Save function.
At the same time, the analog signal system circuit supplies the powers of +4.7 Vdc, −5 Vdc and −4.3 Vdc from the regulated power supply circuits. (Q116, Q117, IC152, IC151 and IC152)

Section 2
Periodic Maintenance and Inspection

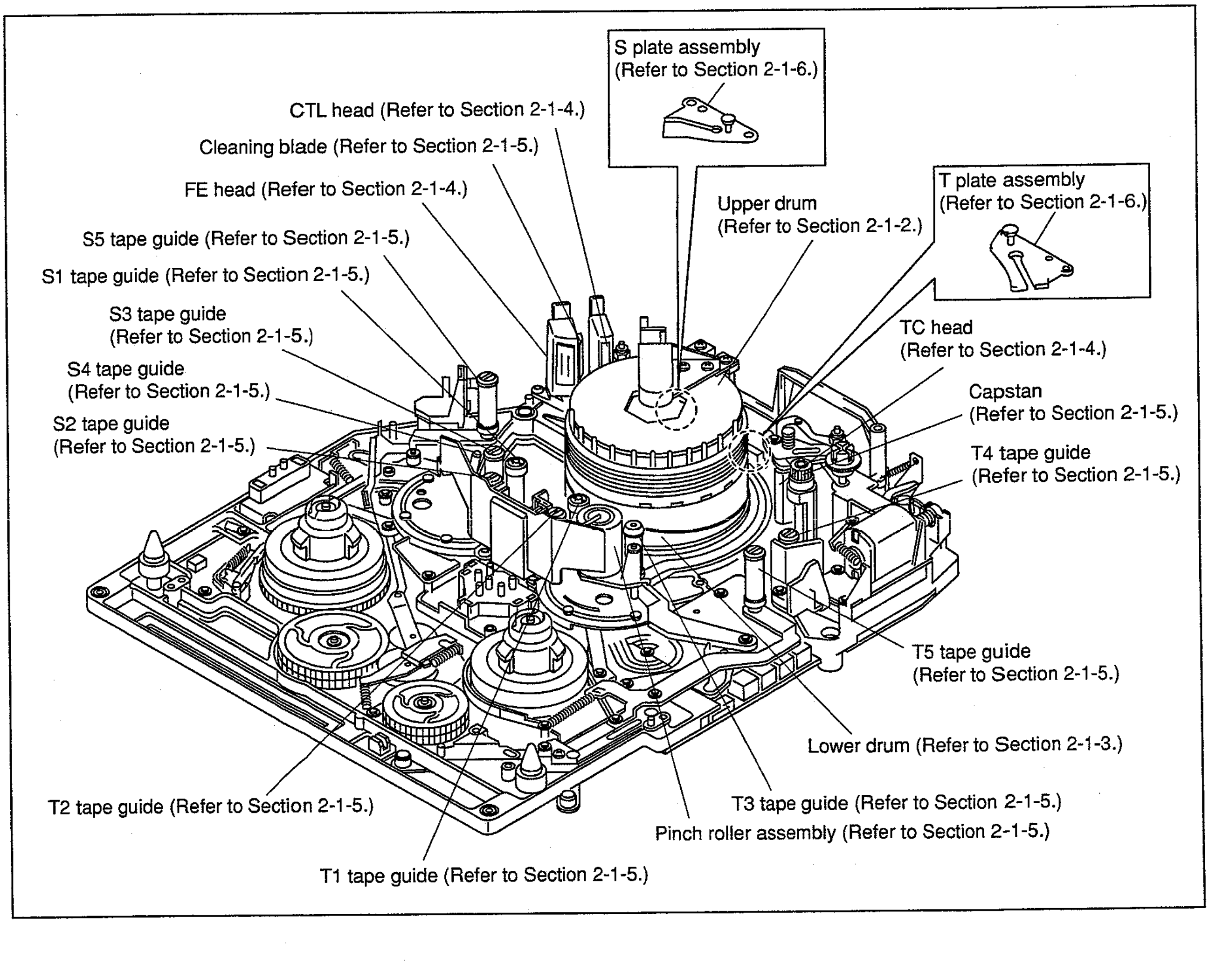
2-1. Cleaning

To make the most of the functions, fully realize the performance of this unit and lengthen the life of the unit and tape, implement cleaning as a daily maintenance.

2-1-1. General Information for Cleaning

1. Index

This section describes methods of cleaning the blocks that are shown in the illustration below.


S plate assembly (Refer to Section 2-1-6.)
CTL head (Refer to Section 2-1-4.)
Cleaning blade (Refer to Section 2-1-5.)
FE head (Refer to Section 2-1-4.)
S5 tape guide (Refer to Section 2-1-5.)
S1 tape guide (Refer to Section 2-1-5.)
S3 tape guide (Refer to Section 2-1-5.)
S4 tape guide (Refer to Section 2-1-5.)
S2 tape guide (Refer to Section 2-1-5.)
Upper drum (Refer to Section 2-1-2.)
T plate assembly (Refer to Section 2-1-6.)
TC head (Refer to Section 2-1-4.)
Capstan (Refer to Section 2-1-5.)
T4 tape guide (Refer to Section 2-1-5.)
T5 tape guide (Refer to Section 2-1-5.)
Lower drum (Refer to Section 2-1-3.)
T2 tape guide (Refer to Section 2-1-5.)
T3 tape guide (Refer to Section 2-1-5.)
Pinch roller assembly (Refer to Section 2-1-5.)
T1 tape guide (Refer to Section 2-1-5.)

2. Notes

WARNING

Never touch the drum while it is rotating.
Touching the drum rotating at a high speed with hands or screwdriver tip, they may be flipped off with a strong force result in physical damage.
Be sure confirm that the drum has come to complete stop before starting cleaning and part replacement.

- Be sure to turn off the main power before cleaning.
- The mechanical blocks of the mechanism deck consist of the precision parts and are adjusted precisely. Be careful not to damage the parts and not to apply any excessive force during cleaning.
- Do not touch the greased portions during cleaning. If grease attaches to the cleaning cloth, replace the cleaning cloth by new one. If the cleaning cloth smeared with grease used, grease may attach to the places where it should not.
- Do not insert a cassette tape before cleaning fluid completely evaporates.

3. Preparation before cleaning

(1) Turn off the main power.
(2) Remove the front lid and the outside panel. (Refer to Section 1-4.)

2-1-2. Cleaning the Upper Drum Tape Running Surface and Video Heads

Note

The upper drum and video heads are the parts that can damage easily. Take care not to damage the upper drum and rotary heads during cleaning.

Tools

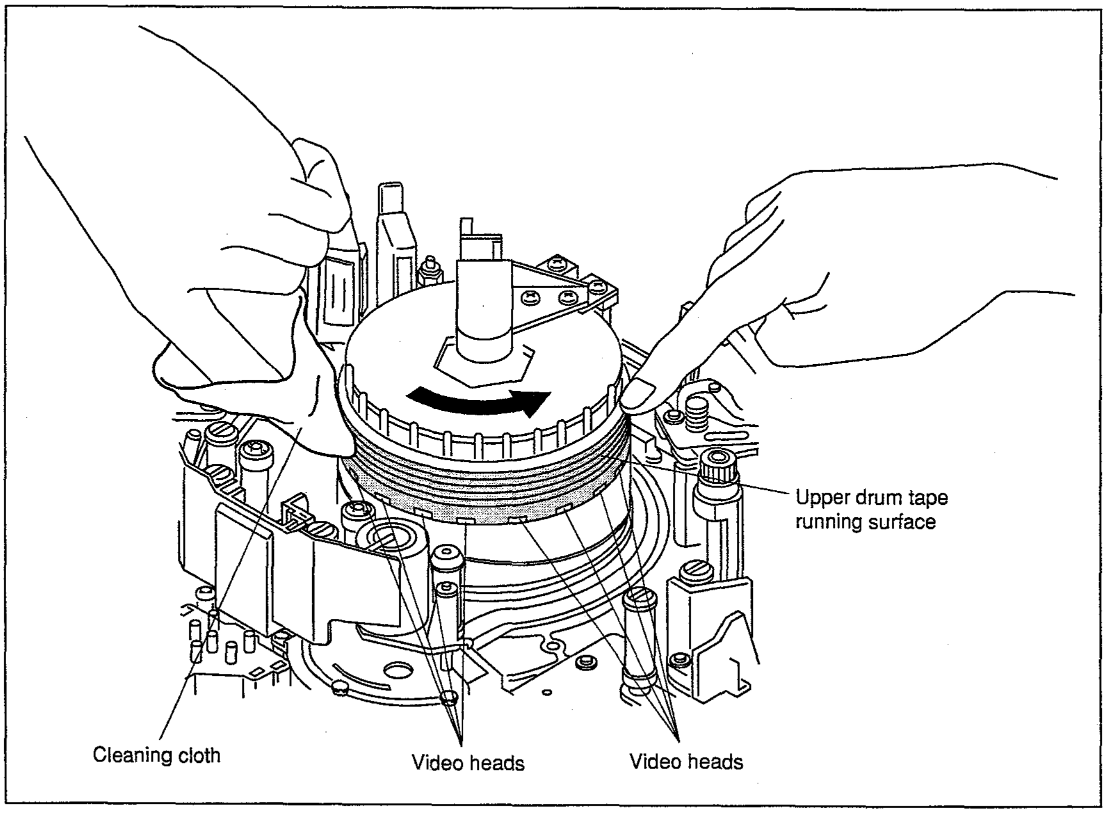
- Cleaning cloth : 3-184-527-01
- Cleaning fluid : 9-919-573-01

Note

Never use a cotton swab.

Procedure

1. Press a cleaning cloth moistened with cleaning fluid slightly against the video heads and rotate the upper drum slowly counter-clockwise.
2. Press a cleaning cloth moistened with cleaning fluid slightly against the tape running surface of the upper drum
   (shaded ▨ portion) as shown in the figure.
   Note
   Be sure to rotate the upper drum counter-clockwise. Be sure to clean the rotary heads along the circumference.
   Do not clean the video heads in the vertical direction. Doing this may damage them.
3. After cleaning, wipe the rotary heads using a dry cleaning cloth.



2-1-3. Cleaning the Lower Drum Tape Running Surface and Rabbet Guide

Note

Take care not to damage the lower drum (specially the rabbet guide surface) during cleaning. Take care to clean the edges above the lower drum because it is near the video head.

Tools

- Cleaning cloth : 3-184-527-01
- Cleaning fluid : 9-919-573-01
- Skewer or an equivalent (Do not use a metallic skewer.)

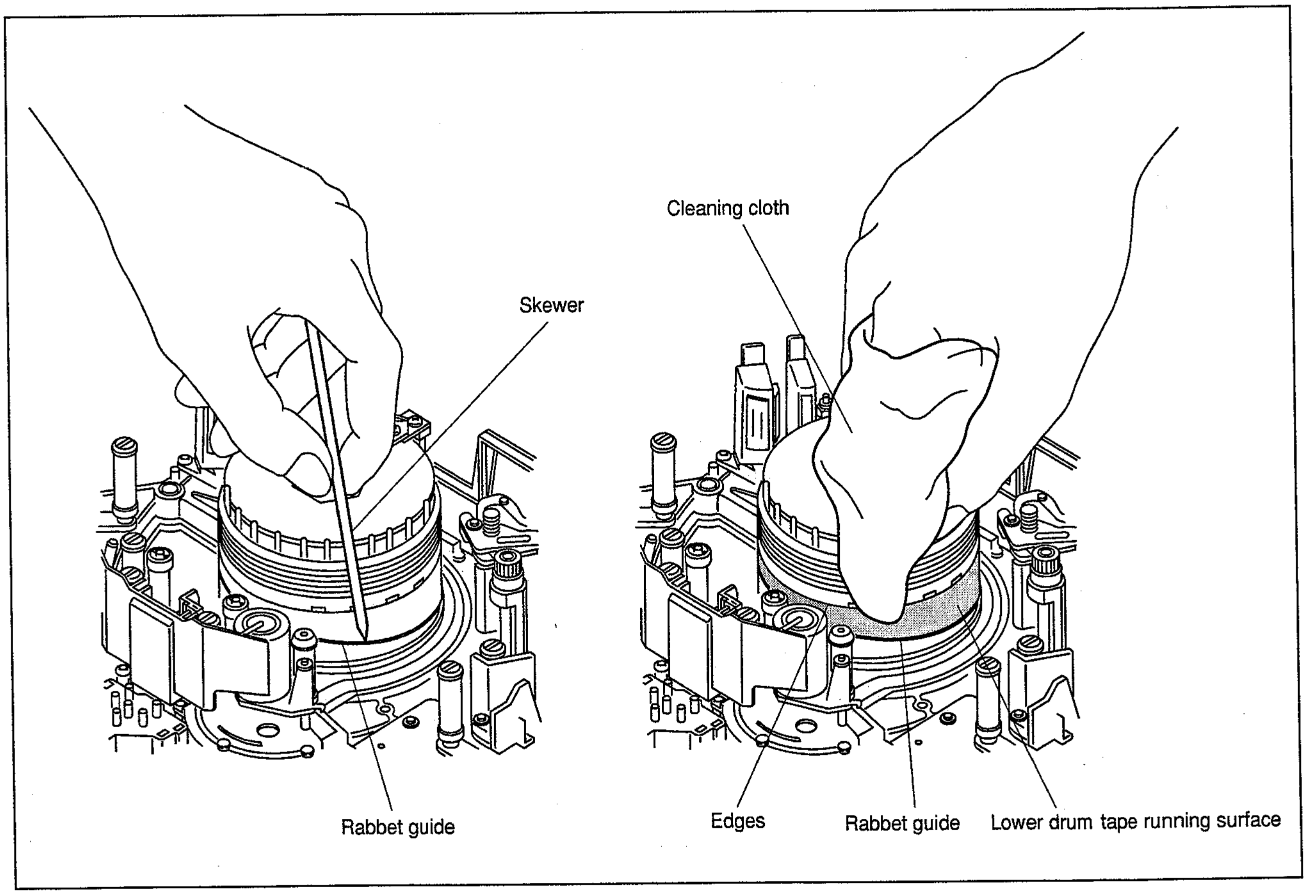
Procedure

1. Put a skew (or an equivalent) along the drum rabbet guide and remove magnetic powder as shown in the figure.

   Notes

   - Do not use a metallic skew instead of a skewer. This may damage the tape running surface.
   - If the magnetic powder is accumulated in the drum rabbet guide, the tape-to-head tracking may badly influence. Remove the magnetic powder completely.

2. Clean the tape running surface of the lower drum and the rabbet guide surface (shaded ▨ portion) as shown in the figure.
3. After cleaning, be sure to wipe the lower drum and the rabbet guide surface using a dry cleaning cloth.



2-1-4. Cleaning the Stationary Heads

CAUTION

The FE head has the cleaning blade.

The cleaning blade has the sharp edge that can cut your hands. Never touch the cleaning blade with bare hands. Be careful also not to cut your hands during cleaning.

Note

Take care not to damage the surfaces of the stationary heads when cleaning.

Tools

- Cleaning cloth : 3-184-527-01
- Cleaning fluid : 9-919-573-01

Procedure

1. Clean the tape running surfaces of the FE, CTL and TC heads in the vertical direction using a cleaning cloth moistened with cleaning fluid.

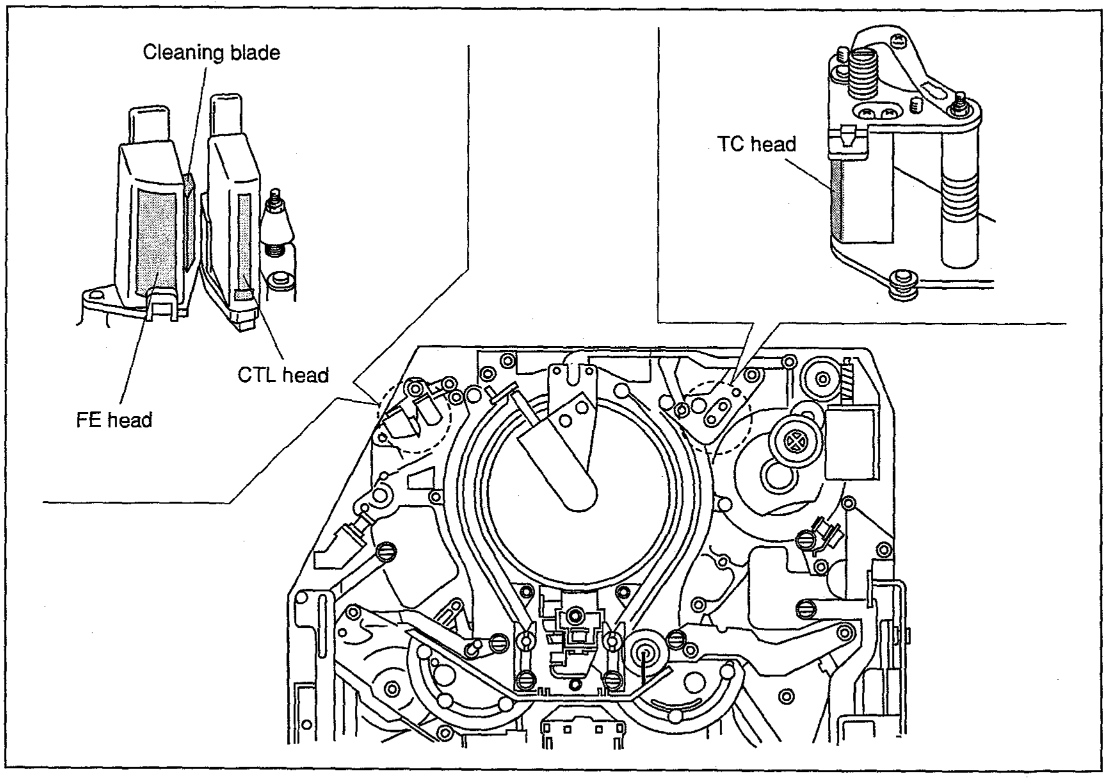
   Note

   If the magnetic powder is accumulated in the head gap of the FE, CTL and TC heads, a playback error may occur during recording/playback. Remove the magnetic powder completely.

2. After cleaning, be sure to wipe the tape running surfaces of the FE, CTL and TC heads using a dry cleaning cloth.

   Note

   Never touch the cleaning blade of the FE head with bare hands.



2-1-5. Cleaning the Tape Running Path and Cleaning Blade

CAUTION

The tape cleaner has the cleaning blade. The cleaning blade has the sharp edge that can cut your hands. Never touch the cleaning blade with bare hands. Be careful also not to cut your hands during cleaning.

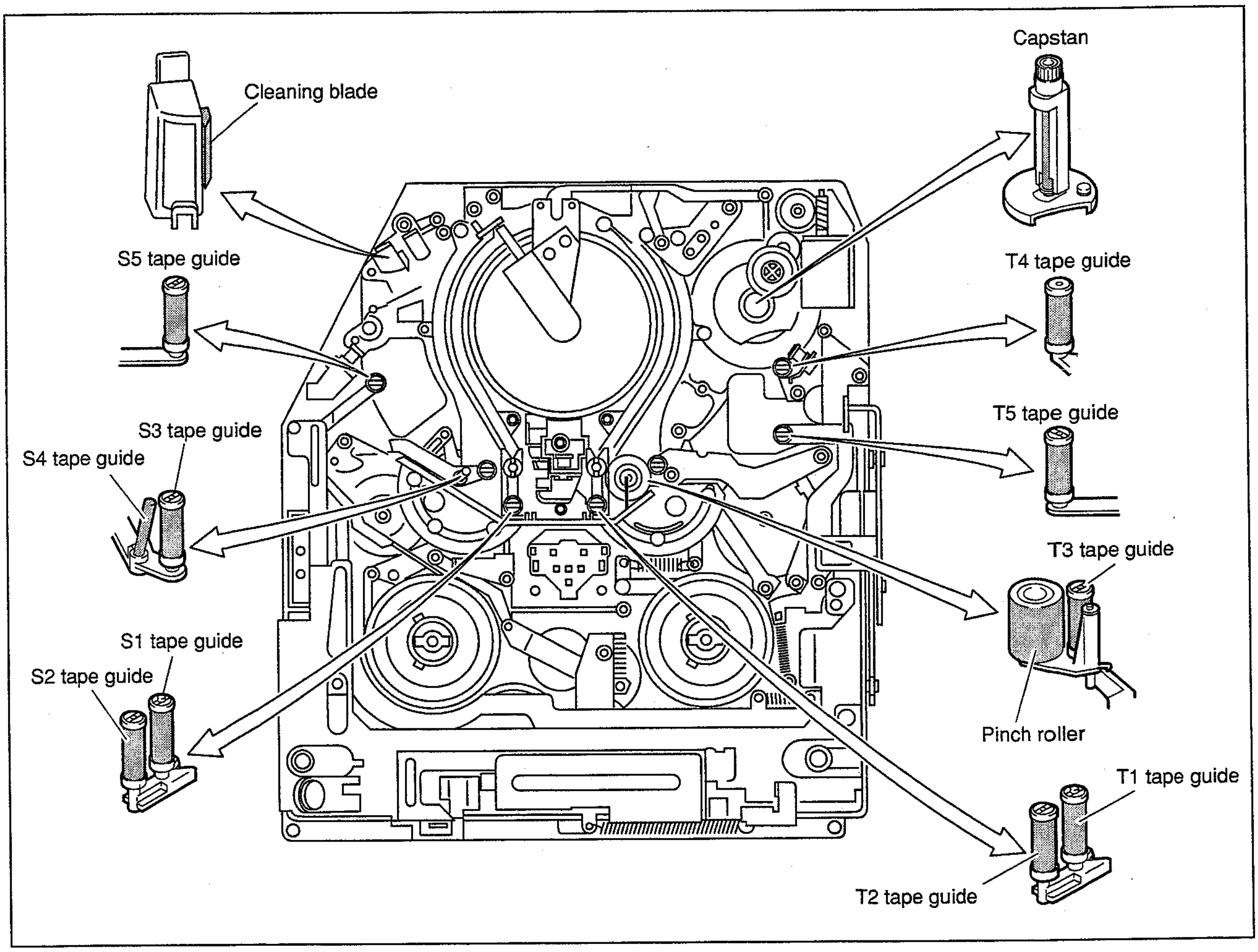
Tools

- Cleaning cloth : 3-184-527-01
- Cleaning fluid : 9-919-573-01

Procedure

1. Clean the tape running surface (shaded ▨ portion) of the following guides and the cleaning blade edge as shown in the figure using a cleaning cloth moistened with cleaning fluid.
(S1 to S5 guides, T1 to T5 guide, capstan, pinch roller, cleaning blade)

2. After cleaning, be sure to wipe them using a dry cleaning cloth.


Cleaning blade
S5 tape guide
S3 tape guide
S4 tape guide
S1 tape guide
S2 tape guide
Capstan
T4 tape guide
T5 tape guide
T3 tape guide
Pinch roller
T1 tape guide
T2 tape guide

2-1-6. Cleaning the S/T Plate Assemblies and S/T Slider Assemblies

Note

The S1, S2 and T1, T2 tape guides are adjusted precisely. Be careful not to add any excessive force during cleaning.

Tools

- Cleaning cloth : 3-184-527-01
- Cleaning fluid : 9-919-573-01

Procedure

1. Clean the top surface (shaded ▨ portions in the illustration where slider passes over) of the S/T plate assemblies using a cleaning cloth moistened with cleaning fluid.
2. Rotate the manual eject gear (A) counter-clockwise until the S/T sliders come to the position as shown in the illustration.
3. Insert a piece of paper that is as thick as the paper of this manual between the front feet (2 locations) of the S/T sliders and the rail. (Raising the slider slightly facilitates this work.) (Fig. 1)
4. While pressing the S1 and T1 tape guides lightly on their top, remove a piece of paper that is inserted in step 3. When a piece of paper is removed, stain and dirt adhere to the paper. Then insert a new paper and remove it for cleaning. Repeat steps 3 and 4 until paper is no more stained. (Fig. 2)
5. Insert a piece of paper between the rear feet (2 locations) of the S/T sliders and the rail.
6. While pressing the S2 and T2 tape guides lightly on their top, remove a piece of paper. When a piece of paper is removed, stain and dirt adhere to the paper. Then insert a new paper and remove it for cleaning. Repeat steps 5 and 6 until paper is no more stained. (Fig. 2)
7. Rotate the manual eject gear (A) clockwise to return to the unthreaded-end position.

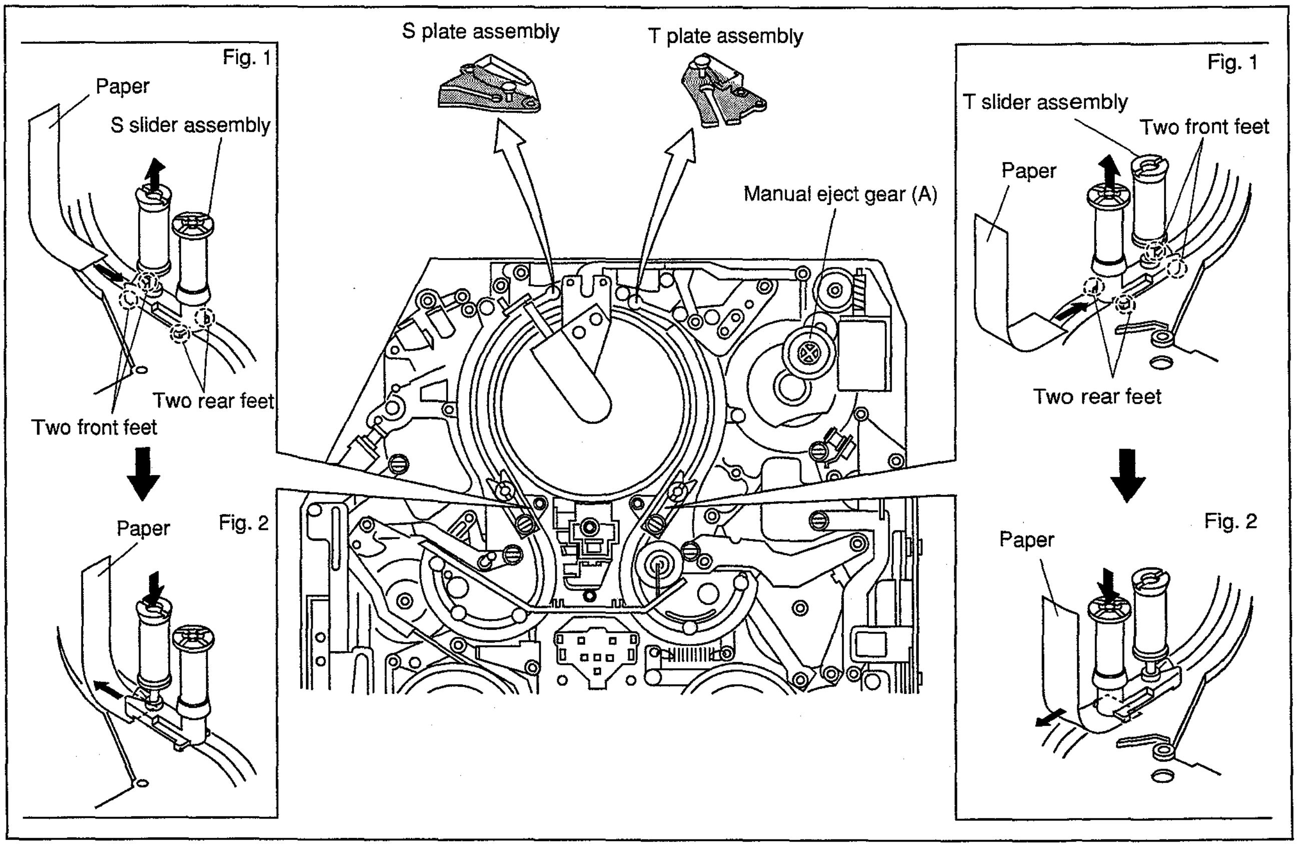


Fig. 1
Paper
S slider assembly
Two rear feet
Two front feet
Paper
Fig. 2
S plate assembly
T plate assembly
Manual eject gear (A)
Fig. 1
T slider assembly
Two front feet
Paper
Two rear feet
Paper
Fig. 2

2-1-7. Cares after Using under Special Environment

Checking the followings is recommended when returned from the news gathering at seaside, at the dusty locations, at hot spring, or if the unit is heavily splashed with water or water leaks in the unit in the rough weather or the like.

1. Carefully clean off sand and dust that entered the unit with airbrush or the like.
2. If salt contained in seawater or sulfur contained in hot spring attaches o the non-painted surface of outer cabinet, the cabinet may corrode in white. If it attaches, wipe it off immediately with alcohol.
3. If water leaks inside the unit, dry the unit with hair-dryer. Check especially that water does not remain in the CCD block or the power supply block.

   Note

   If the unit is not taken care of appropriately, corrosion may occur inside that may cause fire and electric shock.

4. Clean the upper drum, lower drum and stationary heads.
5. Clean the tape running surface (tape guides, capstan shaft, pinch roller and others).
6. Clean out the contacting surface of connectors.
7. Perform the general operational check and confirm that no abnormal sound is heard from inside the unit or the unit operates correctly without any abnormality.

2-2. Periodic Inspection

To make the most of the functions, fully realize performance of the unit and to length the life of the unit and tape, a periodic check is recommended.

2-2-1. Hours Meter

The hours meter values can be displayed on the viewfinder. An hours meter can be reset as desired.
The periodic inspection is recommended to be carried out with these hours meters as a reference.

1. Display method

(1) Press the MENU ON/OFF switch on the side panel to the ON position.
(2) Rotate the rotary encoder to move the arrow mark (→) to DIAGNOSIS.
(3) Press the rotary encoder once.
(4) Press the MENU ON/OFF switch on the side panel to the OFF position to exit the hours meter display.

2. Reset by customer

The hours meters of "5. DRUM RUNNING-2", "6. TAPE RUNNING-2", "7. OPERATION-2" and "8. THREADING-2" can be reset as requested by customer.

(1) Rotate the rotary encoder to move the at mark (@) in front of EXEC of RESET METER.
The message RESET METER: @EXEC appears
(2) Press the rotary encoder.
(3) Rotate the rotary encoder to move the arrow mark (→) to the desired hours meter.
(4) Press the rotary encoder. The desired hours meter is reset.

3. Contents of display

Viewfinder display		Contents
		The following contents are displayed.
DRUM RUNNING	XXXXXH	1. Accumulated drum rotation hours (in units of hour)
TAPE RUNNING	XXXXXH	2. Accumulated tape running hours (in units of hour)
OPERATION	XXXXXH	3. Accumulated power-on hours (in units of hour)
THREADING	XXXXX	4. Accumulated times of threading (Times of actual threading and unthreading)
DRUM RUNNING-2	XXXXH	5. Drum rotation hours (Customer-resetable)
TAPE RUNNING-2	XXXXH	6. Tape running hours (Customer-resetable)
OPERATION-2	XXXXH	7. Power-on hours (Customer-resetable)
THREADING-2	XXXX	8. Times of threading (Customer-resetable)

2-2-2. Periodic Inspection List

Period of parts replacement that are indicated in the list below are not the guarantee term of the parts. Use this list as guidelines for maintenance and inspection. Period of parts replacement varies depending on the operation environment and conditions of the units.

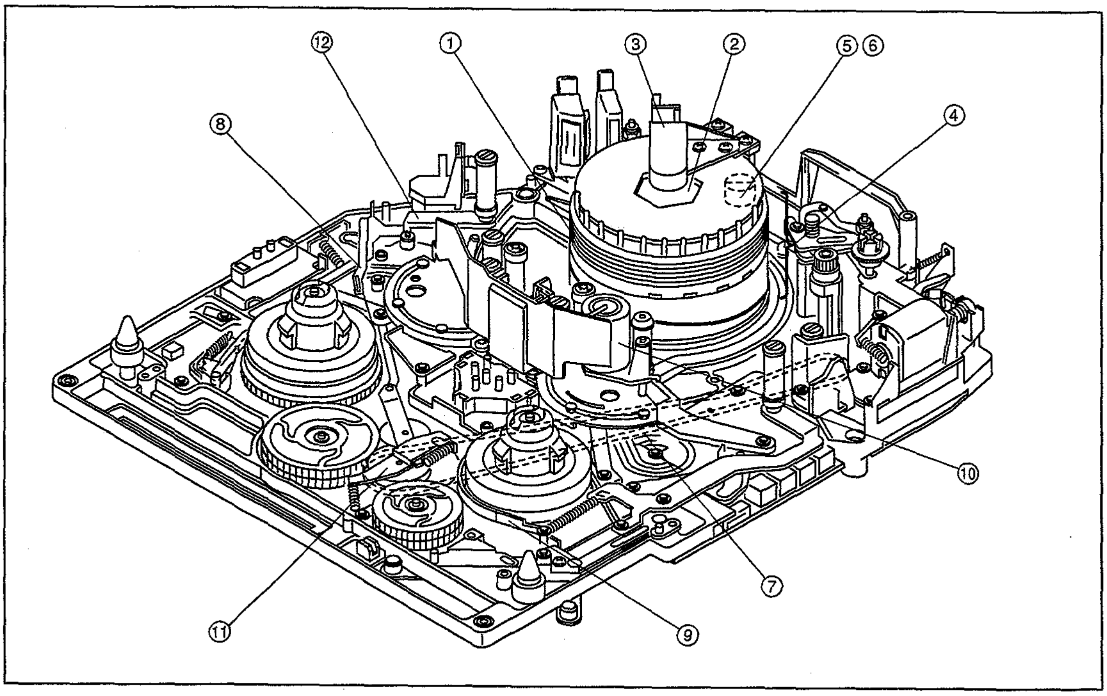
Note

The parts marked by ①, ② and ③ must be replaced at the same time when the drum assembly ④ is replaced.

Mode A: DRUM RUNNING HOUR Mode B: TAPE RUNNING HOUR

R : It indicates the timing of part replacement.
*1 :It indicates the timing of applying oil. (Refer to Section 2-2-3.)
*2 :It indicates tne timing of applying grease. (Refer to Section 2-2-4.)

No.	Inspection item	Mode	Inspection hours			Replacement parts	
			2000	4000	6000	Part name	Part No.
①	Upper drum assembly	A	R	R	–	Upper drum assembly	A-8329-472-A
②	Slip ring assembly	A	R	R	–	Slip ring assembly (RP)	A-8326-899-A
③	Brush assembly	A	R	R	–	Brush assembly (RP)	A-8326-898-A
④	Drum assembly	–	–	–	R	Drum assembly	A-8329-471-A
⑤	AHC roller assembly	A	R	R	R	AHC roller assembly	X-3949-109-1
⑥	CR spacer	A	R	R	R	CR spacer (POM)	3-182-765-02
⑦	Timing belt	B	–	R	–	Timing belt	3-629-223-01
⑧	S-Tension regulator band assembly	B	R	R	R	S-Tension regulator band assembly	X-3605-986-2
⑨	T-Tension regulator band assembly	B	R	R	R	T-Tension regulator band assembly	X-3605-994-3
⑩	Pinch roller assembly	B	R	R	R	Pinch roller assembly	X-3678-926-1
⑪	Reel drive gear assembly	A	*1	*1	R	Reel drive assembly	A-8279-476-D
⑫	S tension regulator assembly	A	*2	*2	*2	–	–



2-2-3. Applying Oil to Reel Drive Gear Assembly

Inspection timing

Refer to Section 2-2-2. Periodic Inspection List.

Tools

Oil : 7-661-018-18

Preparation

1. Check that the unit is in the unthreading end state.
2. Turn off the main power.
3. Remove the front lid and outside panel. (Refer to Section 1-4.)
4. Remove the cassette compartment. (Refer to Section 1-9.)

Applying oil

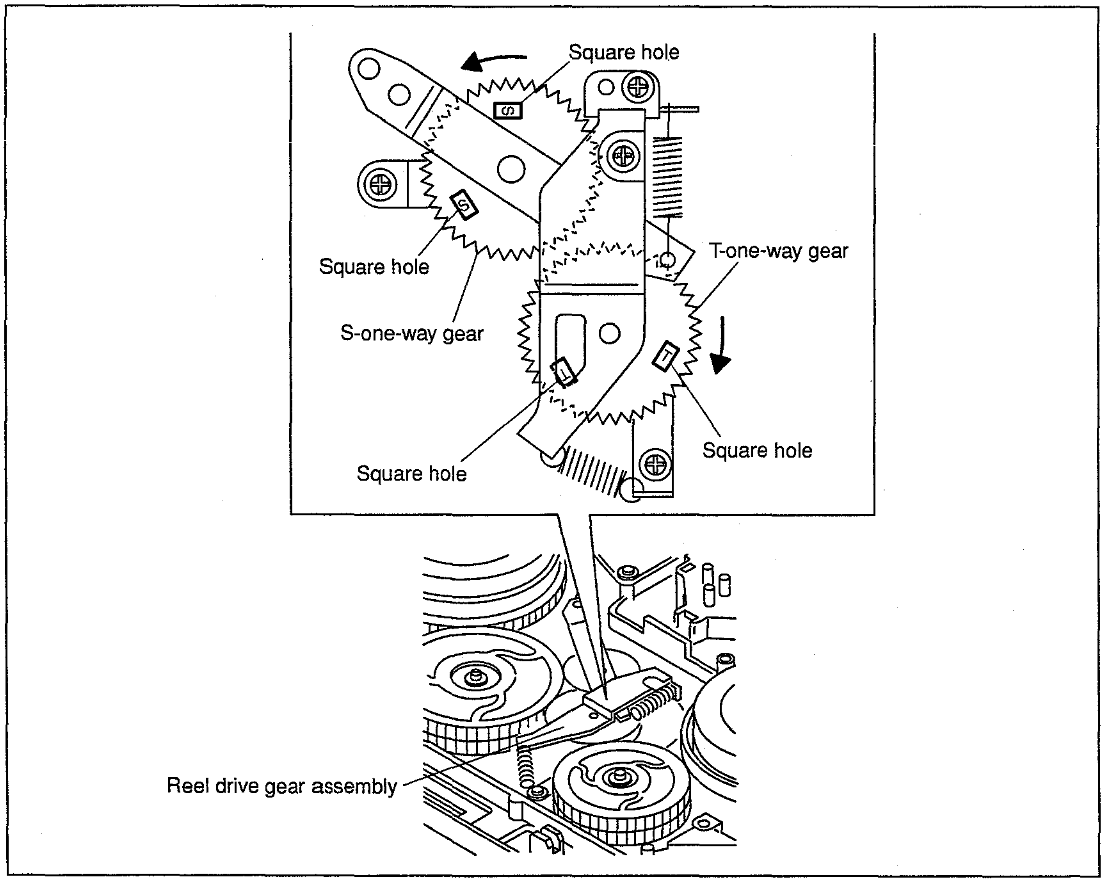
1. Rotate the S/T one-way gear in the direction of the arrow until the square holes showing the letter S or T become visible.
2. Apply a drop of oil to the square holes respectively.

   Note

   Be sure to wipe off the oil that oozes to the surface of the S/T one-way gear, with gauze or cloth.

   Note

   Refer to Section 7-1-5 for using oil.


Square hole
Square hole
T-one-way gear
S-one-way gear
Square hole
Square hole
Reel drive gear assembly

2-2-4. Applying Grease to S Tension Regulator Assembly

Inspection timing

Refer to Section 2-2-2. Periodic Inspection List.

Note

The stop washer is used to assemble the S tension regulator assembly.
Prepare a new stop washer (3-559-408-11) when reassembling the S tension regulator assembly.

Tools

- Grease (SGL-601) : 7-651-000-10
- Stop washer insertion tool : J-6323-530-A
- Cleaning cloth : 3-184-527-01
- Cleaning fluid : 9-919-573-01

Preparation

1. Check that the unit is in the unthreading end state.
2. Turn off the main power.
3. Remove the front lid and outside panel. (Refer to Section 1-4.)
4. Remove the cassette compartment. (Refer to Section 1-9.)
5. Remove the S tension regulator assembly. (Refer to Section 7-21.)

Applying grease and assembling

1. Remove the spring. Then remove the stop washer and remove the S tension regulator arm and plate spring.

   Note

   - Be careful not to lose the plate spring because the plate spring will drop at the same time when the S tension regulator arm is removed.
   - Take note of the original position where the spring is hooked.

2. Wipe off the grease that adheres to the plate spring and to the shaft of the S tension regulator arm with gauze or cloth.

3. Clean the plate spring and the shaft of the S tension regulator arm with cleaning cloth moistened with cleaning fluid.

   Note

   Never apply a strong force to the bent portion of the plate spring.

4. Apply grease to the hatched (▨) portion of the boss.

   Note

   Refer to Section 7-1-5 for the method of applying grease.

5. Install the plate spring to the boss of the S tension regulator arm.

   Note

   Install the plate spring in the direction as shown in Fig. 1.

6. Install the shaft of the S tension regulator arm to which the plate spring is attached, into the hole of the bearing holder and secure it with the new stop washer.

   Note

   Check that the S tension regulator arm can move smoothly by rotating it. If it does not rotate smoothly, check that the plate spring does not drop from boss of the S tension regulator arm and check that the plate spring does not override on top of the rib of the bearing holder. (See Fig. 2)

7. Install the spring that is removed in step 1 to the original position that is taken note.

Note

Install the spring in the direction as shown in Fig. 3.

8. Install the S tension regulator assembly. (Refer to Section 7-21.)

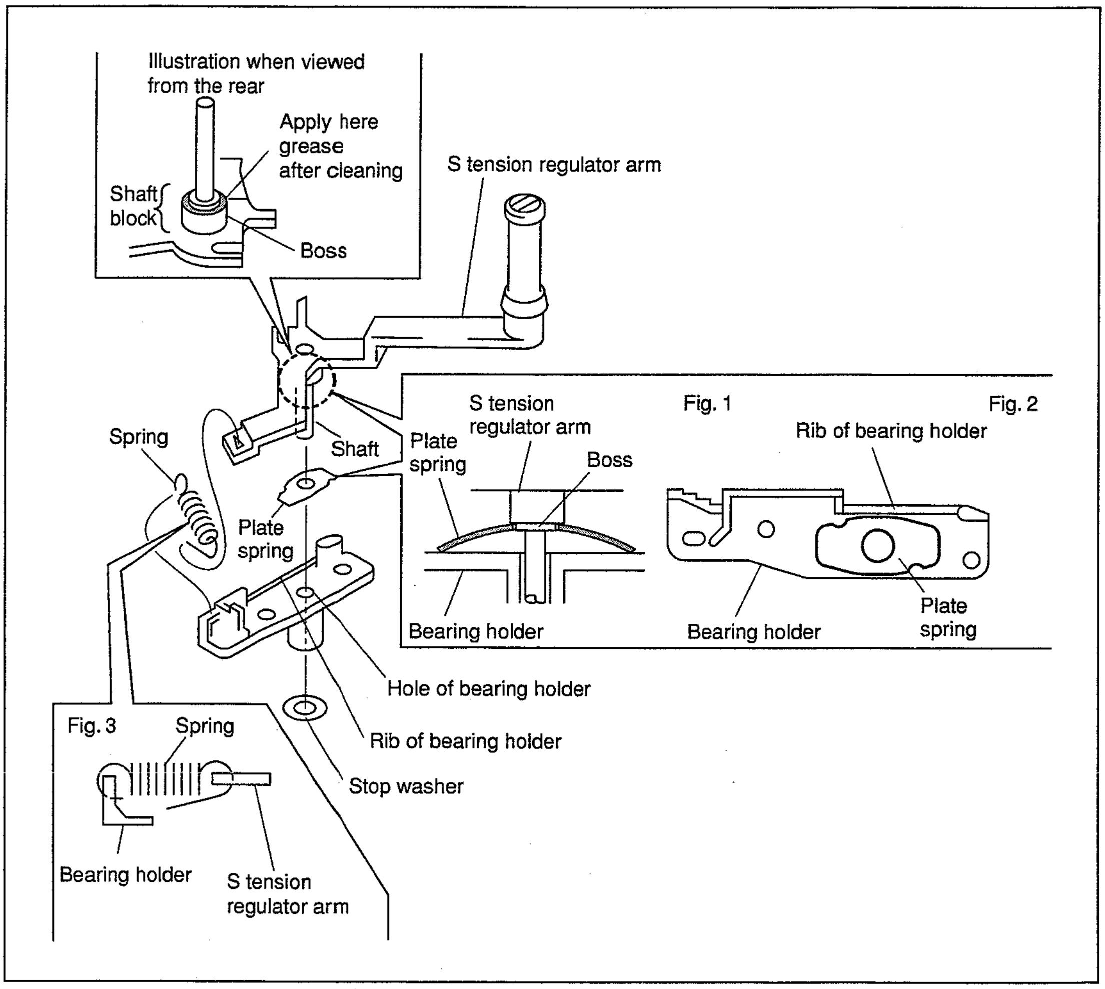


Illustration when viewed from the rear
Apply here grease after cleaning
Shaft
block
Boss
S tension regulator arm
Spring
Shaft
Plate spring
Plate spring
Hole of bearing holder
Rib of bearing holder
Stop washer
S tension regulator arm
Fig. 1
Boss
Bearing holder
Fig. 2
Rib of bearing holder
Bearing holder
Plate spring
Fig. 3
Spring
Bearing holder
S tension regulator arm

2-2-5. Notes on Repair Parts

1. Safety Related Components Warning

WARNING

Components marked ⚠ are critical to safe operation. Therefore, specified parts should be used in the case of replacement.

2. Standardization of Parts

Some repair parts supplied by Sony differ from those used for the unit. These are because of parts commonality and improvement.
Parts list has the present standardized repair parts.

3. Stock of Parts

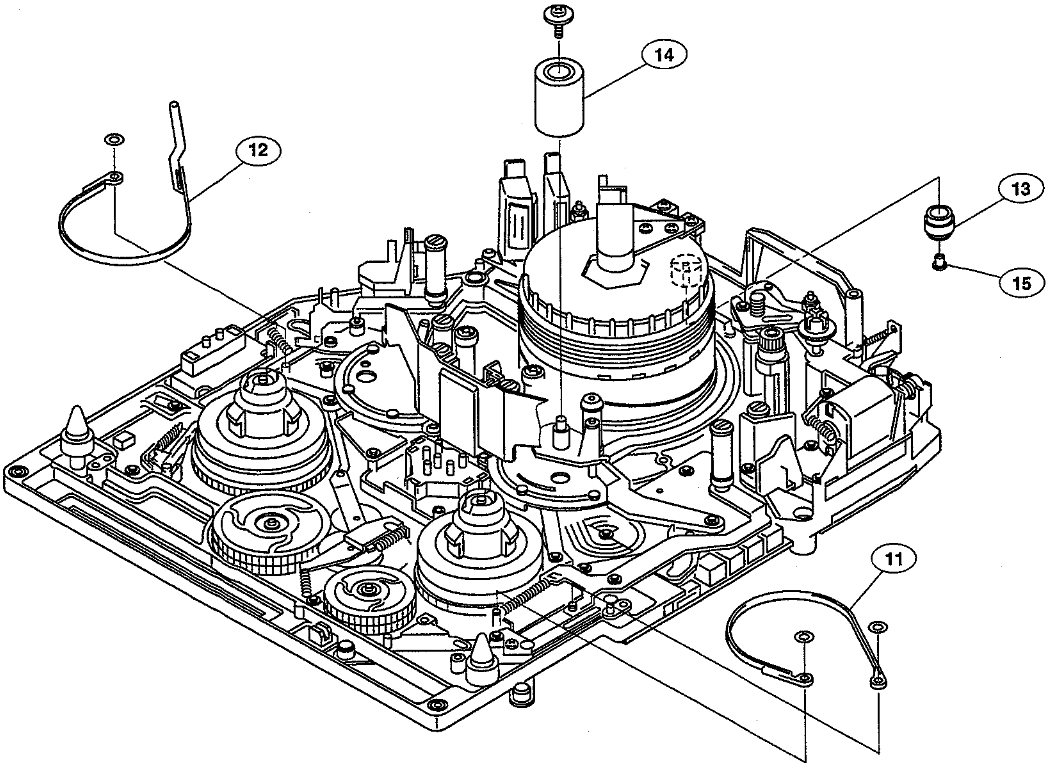
Parts marked with “o” at SP (Supply Code) column of the spare parts list may not be stocked. Therefore, the delivery date will be delayed.

4. Harness

Harnesses with no part number are not registered as spare parts.
In need of repair, get components shown in the list and repair using them.

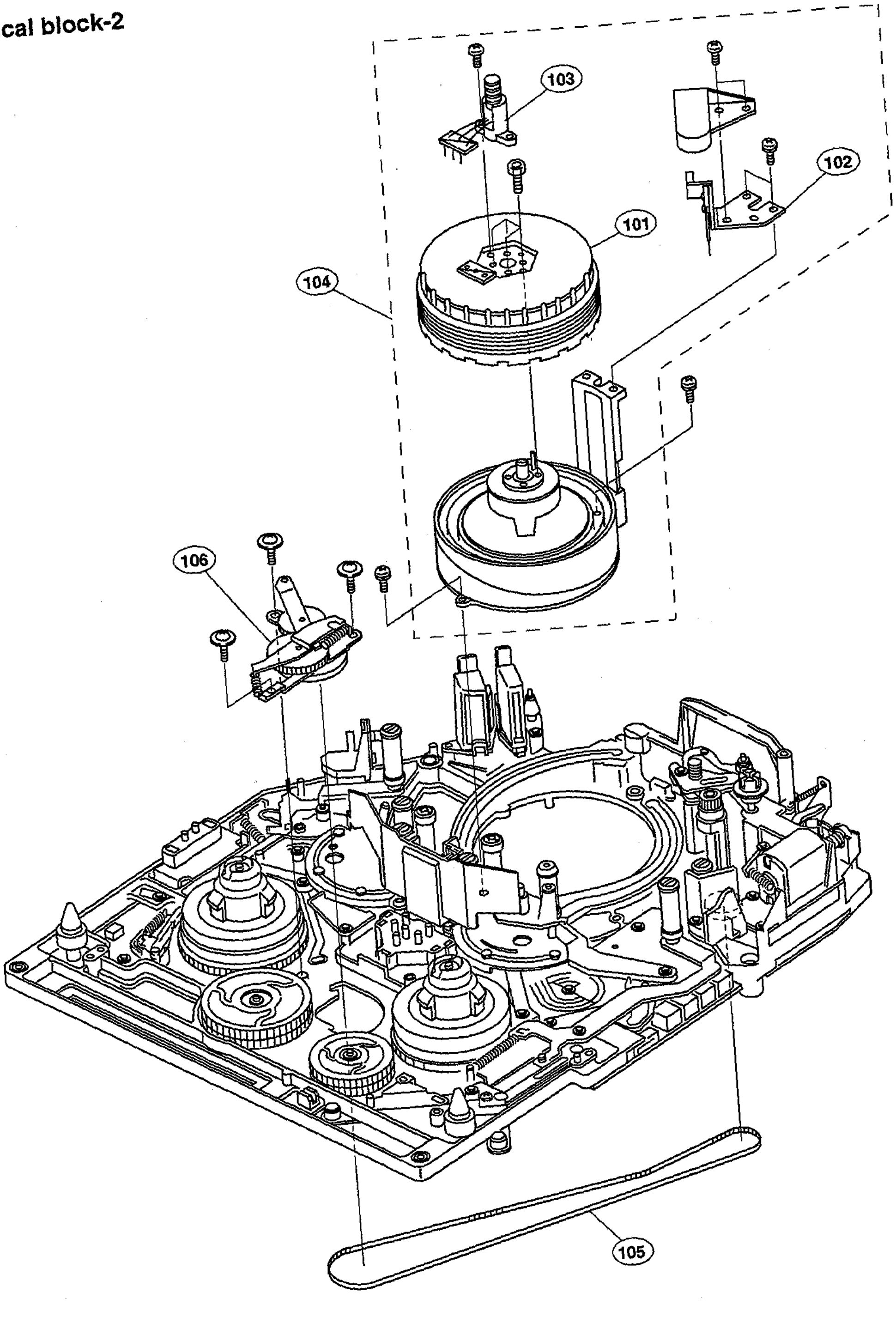
2-2-6. Recommended Periodic Replacement Parts

Mechanical block-1



No.	Part No.	SP	Description
11	X-3605-994-3	s	BAND ASSY, TENSION REGULATOR (T)
12	X-3605-986-2	s	BAND (S) ASSY,TEN-REGI
13	X-3949-109-1	s	ROLLER ASSY,AHC
14	X-3678-926-1	s	PINCH ROLLER ASSY
15	3-182-765-02	s	SPACER, CR

Mechanical block-2



No.	Part No.	SP	Description
101	A-8329-472-A	s	DJR-34A-R
102	A-8326-898-A	s	BRUSH ASSY (RP)
103	A-8326-899-A	s	RING ASSY (RP),SLIP
104	A-8329-471-A	s	DJH-34A-R
105	3-629-223-01	s	BELT, TIMMING
106	A-8279-476-D	o	GEAR ASSY, REEL DRIVE

2-2-7. Recommended Replacement Parts

The parts are recommended to be replaced as needed.

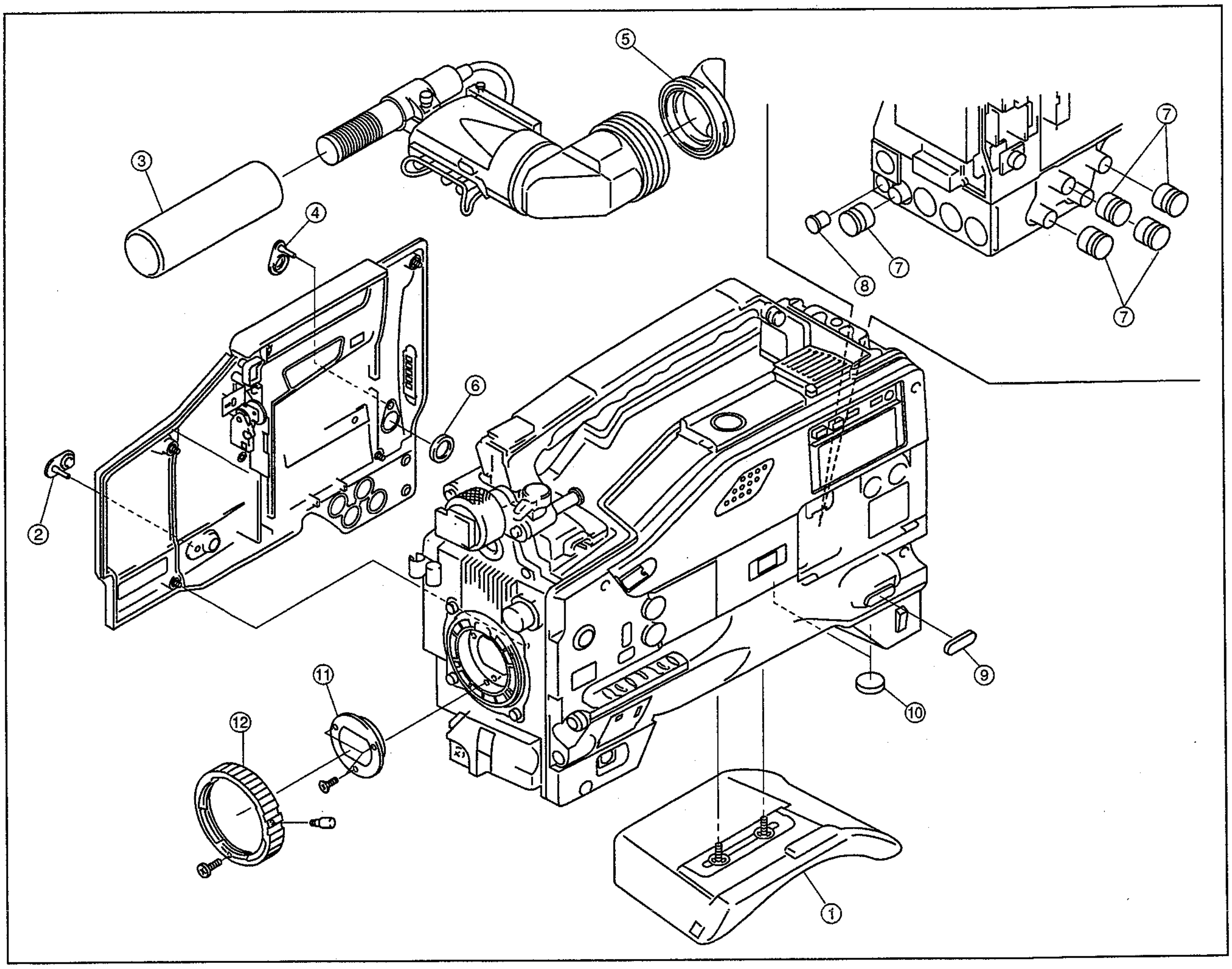
No.	Part name	Sony part No.	Remarks
①	Shoulder pad assembly	A-8279-485-B	Part made of rubber (Note 1)
②	Drop protection (ME)	3-629-424-01	Part made of rubber (Note 1)
③	SCREEN, WIND	3-709-104-01	(Note 1)
④	Cap, Remote	3-629-427-01	Part made of rubber (Note 1)
⑤	Eye cup	3-723-079-03	Part made of rubber (Note 1)
⑥	Rubber, Drop protection (Remote)	3-631-424-01	Part made of rubber (Note 1)
⑦	Cap BNC	3-604-795-01	Part made of rubber (Note 1)
⑧	Cap, DC out	3-609-573-01	Part made of rubber (Note 1)
⑨	Stopper, Ornamental panel	3-742-035-01	Part made of rubber (Note 1)
⑩	Foot, Rubber (SI-RBR)	3-723-097-01	Part made of rubber (Note 1)
⑪	Filter unit, Optical	1-467-820-31 (NTSC) 1-467-820-51 (PAL)	(Note 2)
⑫	Ring, Mount (AL)	3-186-442-01	Replace every five years. (Note 3)
–	Battery, Lithium (CR-2450)	1-528-229-41	Replace every five years. (on the BP-33 board) (Note 4)

Note 1 : Check for deformation and deterioration from time to time. Replace it as necessary.

Note 2 : The optical filter unit can become nebulous (intransparent and whitened) with elapse of time. Then it will not satisfy the required characteristics. Replace it as needed.

Note 3 : There can be a case that the lens cannot be securely fixed due to abrasion after long hours of use. Check deformation and deterioration, and replace it as necessary.
Repair part has the different shape from the part that is used in the factory-shipped product. However, replacing the mount ring with a new one for repair is no problem since both parts have complete interchangeability each other.

Note 4 : Refer to Section 1-21 for details.


⑤
③
④
⑦
⑦
⑧
⑦
⑥
②
⑨
⑩
⑪
⑫
①

Section 3
Error Diagnostics

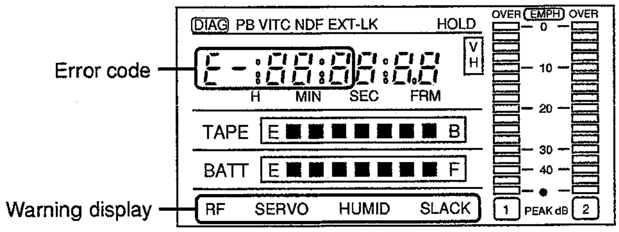
The MSW-900/900P has a built-in error diagnostics function for internal abnormalities.
Among the various functions of these error diagnostics, this section describes only the error codes. They are displayed when an abnormality occurs in the tape run system and the self-diagnostics function which displays the communication status of the devices on the various circuit boards.
In addition to the above error codes and self-diagnostics function, the MSW-900/900P has various warning systems such as a warning indicator in the display window and a warning sound. For details of these warning systems that are not described in this section, refer to the Operation Manual of the MSW-900/900P.

3-1. When Does the Error Code Appear?

The warning indicator in the display window turns on when an abnormality occurs immediately after the power is turned on or an abnormality occurs during normal operation. Note that only when the "SLACK" indicator turns on, the corresponding error code is displayed in the time code area of the display window.

Note

The contents of the respective warning indicators are shown below for reference.
RF : Turns on when a video head is clogged.
SERVO : Turns on when a servo system malfunctions.
HUMID : Turns on when condensation occurs.
SLACK : Turns on when an abnormality occurs in the tape run system.



Display window

3-1-1. Description of Error Codes

The structure and the list of error codes are as follows.
Details of the error codes (with detecting conditions and suspected causes) are described in Section 3-1-2 in numerical order of the error codes.

E-X XX

Command when the error occurs
0 : POWER ON
1 : REC
2 : REC PAUSE
3 : THREAD
4 : UNTHREAD
5 : STOP
8 : PLAY
9 : FF
A : REW
b : REC REVIEW
C : Rewinding to tape top
E : FF search
F : REW search

Cause of the error
10 : Drum drive voltage is abnormal.
11 : Drum FG signal is abnormal.
12 : Drum PG signal is abnormal.
20 : Capstan drive voltage is abnormal.
21 : Capstan FG signal is abnormal.
23 : Direction of capstan rotation is abnormal.
24 : Capstan speed is abnormal.
32 : S-reel FG signal is abnormal.
42 : T-reel FG signal is abnormal.
61 : Function cam forward rotation time-over
62 : Function cam reverse rotation time-over
63 : Tape top sensor time-over
64 : Full top sensor time-over
65 : Tape end sensor time-over
70 : Servo EEPROM communication is abnormal.
71 : System control initialization command is abnormal.

Error list

	Code	Contents	Page
Drum system	10	Drum drive voltage is abnormal.	3-4
	11	Drum FG signal is abnormal.	3-4
	12	Drum PG signal is abnormal.	3-4
Capstan system	20	Capstan drive voltage is abnormal.	3-4
	21	Capstan FG signal is abnormal.	3-4
	23	Direction of capstan rotation is abnormal.	3-5
	24	Capstan speed is abnormal.	3-5
Reel system	32	S-reel FG signal is abnormal.	3-5
	42	T-reel FG signal is abnormal.	3-5
Function cam system	61	Function cam forward rotation time-over	3-5
	62	Function cam reverse rotation time-over	3-6
Sensor system	63	Tape top sensor time-over	3-6
	64	Full top sensor time-over	3-6
	65	Tape end sensor time-over	3-6
Communication system	70	Servo EEPROM communication is abnormal.	3-6
	71	System control initialization command is abnormal.	3-6

Protection operation when SLACK is detected

When SLACK is detected, the tape run system stops automatically.

Tape eject operation when SLACK is detected

Even when SLACK is detected, the EJECT command can be accepted but the tape is unthreaded interruptedly as described below.

1) When the EJECT key is pressed, the tape is unthreaded for a certain period of time and after that tape stops.
2) When the EJECT key is kept pressed, unthreading and pausing are repeated until the tape is completely ejected.
   The moment the EJECT key is released, the tape remains in the stop state.

When the Emergency EJECT is activated

When the Emergency EJECT is activated, there are cases that the tape is rewound.
If you continue recording from the point of Emergency EJECT, the previously recorded information will be possibly overwritten. To avoid this trouble, be sure to check the tape position whenever you have activated Emergency EJECT.

3-1-2. Details of Error Codes

SLACK-10

Contents : Abnormality is detected in the drum drive voltage.
Detecting conditions : The specified time has elapsed with the drum drive voltage exceeding its rated voltage.
Suspected cause :
- Tape tension is so high that the drum motor cannot rotate.
- Drum motor drive circuit (MDR-14 board) is defective.
- Drive voltage detector circuit (MDR-14, SS-92 boards) is defective.
- Drum motor is defective.

SLACK-11

Contents : Abnormality is detected in the drum FG signal.
Detecting conditions : The drum FG counter does not start counting.
Suspected cause :
- Tape tension is so high that the drum motor cannot rotate.
- Drum motor drive circuit (MDR-14 board) is defective.
- Drum FG detector circuit (MDR-14, SS-92 boards) is defective.
- Synchronization (DVP-20 board) with the reference signal (DVP_REF_FRM/CF) is faulty.
- Drum motor is defective.

SLACK-12

Contents : Abnormality is detected in the drum PG signal.
Detecting conditions : The drum PG signal cannot be detected even when the drum makes more than one complete revolution.
Suspected cause :
- Drum PG detector circuit (MDR-14, SS-92 boards) is defective.
- Drum motor is defective.

SLACK-20

Contents : Abnormality is detected in the capstan drive voltage.
Detecting conditions : The specified time has elapsed with the capstan drive voltage exceeding its rated voltage.
Suspected cause:
- Mechanical load to the capstan motor is so high that the capstan motor cannot rotate. (Mechanical reason)
- Capstan motor drive circuit (MDC-13A board) is defective.
- Drive voltage detector circuit (MDC-13A, SS-92 boards) is defective.
- Capstan motor is defective.

SLACK-21

Contents : Abnormality is detected in the capstan FG signal.
Detecting conditions : The capstan FG counter does not start counting. (Only in the ×1 speed or more)
Suspected cause :
- Mechanical load to the capstan motor is so high that the capstan motor cannot rotate. (Mechanical reason)
- Capstan motor drive circuit (MDC-13A board) is defective.
- Capstan FG detector circuit (MDC-13A, SS-92 boards) is defective.
- Capstan motor is defective.

SLACK-23

Contents : Abnormality is detected in the rotating direction of capstan.

Detecting conditions : Direction command of the capstan rotation does not match with the detected direction of capstan rotation for the specified period of time.

Suspected cause :
- Capstan motor drive circuit (MDC-13A board) is defective.
- Capstan FG detector circuit (MDC-13A, SS-92 boards) is defective.
- Capstan motor is defective.

SLACK-24

Contents : Abnormality is detected in the capstan speed.

Detecting conditions : The measured capstan speed does not reach the specified speed even when the specified time has elapsed. (Only in the ×1 speed or more)

Suspected cause :
- Mechanical load to the capstan motor is so high that the capstan motor cannot reach the specified speed. (Mechanical reason)
- Capstan motor drive circuit (MDC-13A board) is defective.
- Capstan FG detector circuit (MDC-13A, SS-92 boards) is defective.
- Capstan motor is defective.

SLACK-32

Contents : Abnormality is detected in the S-reel FG signal.

Detecting conditions : The S-reel FG counter does not count up nor down while the tape is running. (Only in the ×1 speed or more)

Suspected cause :
- Pressure force of the pinch arm is insufficient.
- Mechanical driving force is not transmitted to the S-reel. (Mechanical reason)
- S-reel FG detector circuit (MDC-13A, SS-92 boards) is defective.
- Tape is being broken.
- Tape tension is so high that the tape cannot run.

SLACK-42

Contents : Abnormality is detected in the T-reel FG signal.

Detecting conditions :
(1) The T-reel FG counter does not count up nor down during unthreading.
(2) The FWD tape movement at the end of threading cannot be completed.
(3) The reel tightening operation during cassette-in and cassette-out cannot be completed.
(4) The T-reel FG counter does not count up nor down while the tape is running. (Only in the ×1 speed or more)

Suspected cause :
- Cassette tape is not inserted. (Cassette-in sensor is defective.)
- Pressure force of the pinch arm is insufficient.
- Mechanical driving force is not transmitted to the T-reel. (Mechanical reason)
- T-reel FG detector circuit (MDC-13A, SS-92 boards) is defective.
- Tape is being broken.
- Tape tension is so high that the tape cannot run.

SLACK-61

Contents : Time-over of the function cam forward rotation is detected.

Detecting conditions : The function cam cannot complete its forward rotation within the specified time.

Suspected cause :
- Mechanical load to the gear block is so high that it cannot drive the function cam. (Mechanical reason)
- Reflection seal for detecting the cam position is dirty.
- Loading motor is defective.
- Loading motor drive circuit (MDC-13A, SS-92 boards) is defective.
- Cam position detector circuit (MDC-13A, SS-92 boards) is defective.

SLACK-62

Contents : Time-over of the function cam reverse rotation is detected.
Detecting conditions : The function cam cannot complete its reverse rotation within the specified time.
Suspected cause :
- Mechanical load to the gear block is so high that it cannot drive the function cam. (Mechanical reason)
- Reflection seal for detecting the cam position is dirty.
- Loading motor is defective.
- Loading motor drive circuit (MDC-13A, SS-92 boards) is defective.
- Cam position detector circuit (MDC-13A, SS-92 boards) is defective.

SLACK-63

Contents : Time-over of the tape top sensor is detected.
Detecting conditions : The short-forward tape movement after tape top detection cannot be completed within the specified time.
Suspected cause :
- Tape tension is so high that the tape cannot run. (Mechanical reason)
- Tape position detector sensor circuit (MDC-13A, SS-92 boards) is defective.
- Tape top sensor is defective.

SLACK-64

Contents : Time-over of the full top sensor is detected.
Detecting conditions : Tape full top is detected at the end of loading.
Suspected cause :
- Tape position detector sensor circuit (MDC-13A, SS-92 boards) is defective.
- Full top sensor is defective.

SLACK-65

Contents : Time-over of the tape end sensor is detected.
Detecting conditions : The short-reverse tape movement after tape end detection cannot be completed within the specified time.
Suspected cause :
- Tape tension is so high that the tape cannot run. (Mechanical reason)
- Tape position detector sensor circuit (MDC-13A, SS-92 boards) is defective.
- Tape end sensor is defective.

SLACK-70

Contents : Abnormality is detected in the servo EEPROM communication.
Detecting conditions : (1) The error in the communication with the servo EEPROM is detected.
(2) The checksum does not match.
Suspected cause :
- IC403 on the MDC-13A board is defective.
- Signal path between the MDC-13A board and the SS-92 board is defective.

SLACK-71

Contents : Abnormality is detected in the system control initialization command.
Detecting conditions : The initialization command is not completed within the specified time at the event of power-on with a cassette being inserted.
Suspected cause :
- Signal path between the FP-121A board and the SS-92 board is defective.

3-2. Device Check

The MSW-900/900P has the self-diagnostics function to check the communication function of the respective devices.
Result of the self-diagnostics is displayed on the [DEV STATUS display] of the DIAGNOSIS menu. (For more details, refer to Section "4. Setup Menu".)

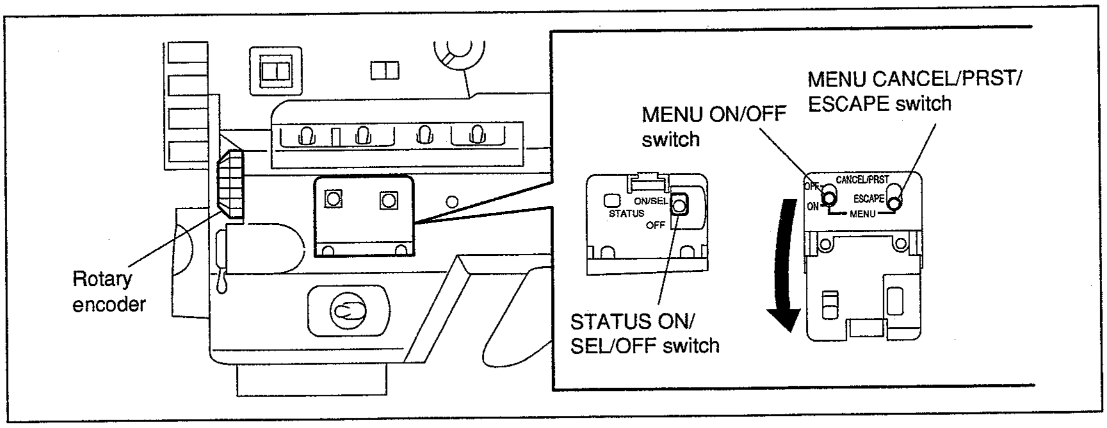
Section 4
Setup Menu

4-1. Setup Menus

The MSW-900/900P has setup menus for making various settings and adjustments. The setup menus of this unit include the USER menu, MENU CUSTOMIZE menu, ALL menu, OPERATION menu, PAINT menu, MAINTENANCE menu, FILE menu, DIAGNOSIS menu and SERVICE menu.
The setup menus are displayed on the viewfinder of this unit.

4-1-1. Basic Operations of Setup Menus

Identifying switches



MENU ON/OFF switch
Use this switch to display the setup menu. When the lid is closed, the switch is set to the OFF position.
ON : Displays the setup menu.
OFF : Exits the setup menu.

MENU CANCEL/PRST/ESCAPE switch
Use this switch to cancel the setup of the items that are selected by the setup menu, or return to the initial setup when the MENU ON/OFF switch is in the ON position.
CANCEL/PRST : Cancels the executed setup or returns to the initial (PRST) setup.
ESCAPE : Returns to the display of one layer higher in the menu hierarchy.

STATUS ON/SEL/OFF switch
Use this switch to show or to clear the setup displays in order to confirm various settings and statuses when the MENU ON/OFF switch is in the OFF position.
ON/SEL : Shows the various settings and status check displays for about 10 seconds. Each press of this switch turns over the display page.
OFF : Clears the display that is selected by ON/SEL.

Rotary encoder
When rotated : Moves to the other pages or items, or changes the setup value.
When pressed : Enters the page set mode or the setup value modification mode.

Operating procedure

1. Set the MENU ON/OFF switch to ON.
2. To move to another page, rotate the rotary encoder. (Press the rotary encoder to set it.)
3. To move to another item, rotate the rotary encoder.

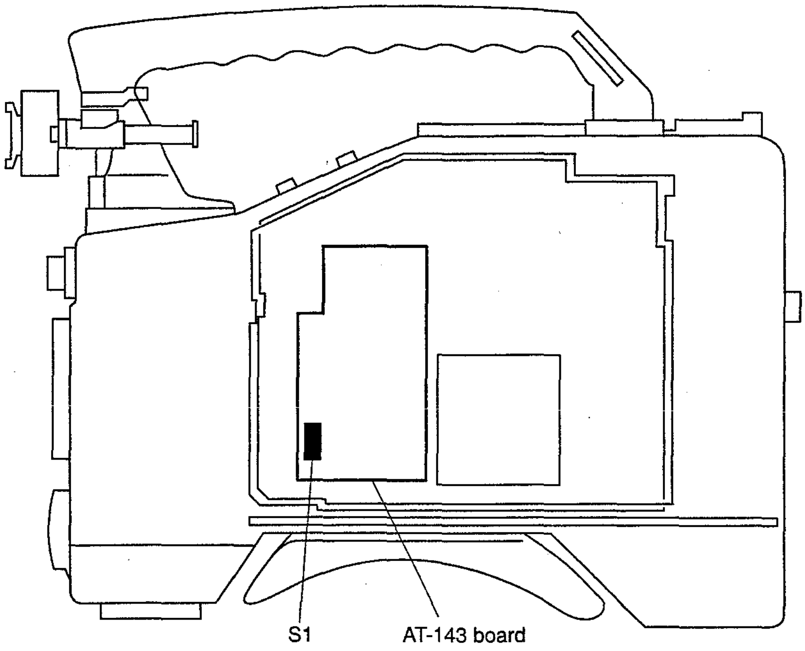
   Note

   Pressing the rotary encoder enters the setup value modification mode.

4. To modify a setup value, rotate the rotary encoder.
5. Set the MENU ON/OFF switch to OFF to exit the setup menu.

4-1-2. How to Display the SERVICE Menu

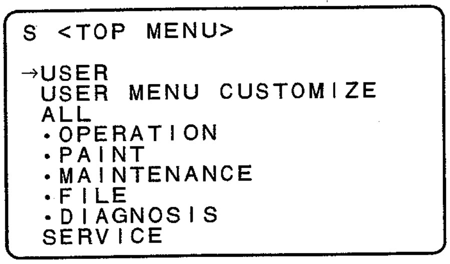
Set the switch S1-1/AT-143 board to the ON position to display the SERVICE menu.



4-2. TOP Menu

While pressing the rotary encoder, set the MENU ON/OFF switch to ON. Then the TOP menu appears. However, the TOP menu is not displayed when the switch S3 (TOP MENU DISABLE)/AT-143 board is in the ON position.

TOP MENU Display



```
S <TOP MENU>

→USER
 USER MENU CUSTOMIZE
 ALL
 •OPERATION
 •PAINT
 •MAINTENANCE
 •FILE
 •DIAGNOSIS
 SERVICE
```

Menu	Function
USER	Use the USER menu to set the functions that are used for daily routine operations such as MONITOR OUT setting. (This menu appears when the MENU ON/OFF switch is set to ON normally.)
USER MENU CUSTOMIZE	Use this menu to add or delete the pages that are required for the USER menu to suit operators' needs depending on applications. (For more details, refer to "4-6-3. Editing the USER Menu" of Operation Manual.)
ALL	The ALL menu contains all the categories of the USER (from page 1 to 5), OPERATION, PAINT, MAINTENANCE, FILE and DIAGNOSIS respectively. It means that you can move to any page from the ALL menu without returning to the TOP menu.
OPERATION	Usually, the camera operator is expected to use the OPERATION menu to set or change the preference setups to suit the shooting conditions of each object.
PAINT	Use this menu to implement fine adjustment of pictures by monitoring the camera output waveform on a waveform monitor.
MAINTENANCE	This is the camera maintenance menu. Use this menu to set the PAINT items of lower operating frequency or to alter the system configuration.
FILE	This is the file operation menu. Use this menu to save data in the REFERENCE file etc.
DIAGNOSIS	Use this menu to check the VTR status or to diagnose the circuit boards that are suspected to have an error.
SERVICE	Use this menu for service and maintenance. (This menu is enabled when the switch S1-1/AT-143 board is set to ON.)

4-3. USER Menu

A user can select the desired menus that the user uses frequently in daily operation and can store them in the USER menu.

The USER menu contains the following menu items as the default when the unit was shipped from the factory.

Add or delete the menu items as desired with the use of the MENU CUTOMIZE menu.

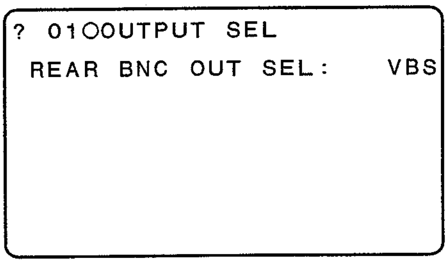
Name of page	Name of category
OUTPUT SEL	OPERATION
FUNCTION1	OPERATION
VF DISP1	OPERATION
VF DISP2	OPERATION
'!' LED	OPERATION
MARKER1	OPERATION
GAIN SW	OPERATION
VF SETTING	OPERATION
AUTO IRIS	OPERATION
SHOT ID	OPERATION
SHOT DISP	OPERATION
SET STATUS	OPERATION
USER FILE	FILE
LENS FILE	OPERATION

4-4. OPERATION Menu

Note

When the range of setting is surrounded by parenthesis ( ) in the setting column, the setup value is the relative value. The range of setting in parenthesis ( ) can be different from what shown in the manual depending on the setting in the layer lower than this menu.

OUTPUT SEL Display (Setting the Output Signal)

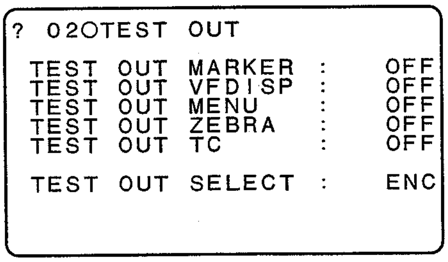


```
? 01OOUTPUT SEL
 REAR BNC OUT SEL:   VBS
```

Item	Setting	Function
REAR BNC OUT SEL	OFF/VBS/SDI	Selects the output signal from the VBS/SDI OUT terminal. VBS : VBS signal SDI : SDI signal*1 OFF : No output signal

*1 : It is enabled only when the SDI OUTPUT board DIF-113 (MSDW-902) is installed.

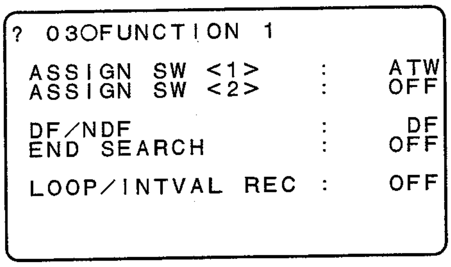
TEST OUT Display (Setting the TEST OUT signal)



```
? 02OTEST OUT
 TEST OUT MARKER  :   OFF
 TEST OUT VFDISP  :   OFF
 TEST OUT MENU    :   OFF
 TEST OUT ZEBRA   :   OFF
 TEST OUT TC      :   OFF

 TEST OUT SELECT  :   ENC
```

Item	Setting	Function
TEST OUT MARKER	OFF/ON	Turns ON/OFF the function to output the VF marker to the TEST OUT terminal.
TEST OUT VFDISP	OFF/ON	Turns ON/OFF the function to output the characters that appear on VF, to the TEST OUT terminal when the VF's DISPLAY switch is set to ON.
TEST OUT MENU	OFF/ON	Turns ON/OFF the function to output the menus that appear on VF, to the TEST OUT terminal when the MENU ON/OFF switch is set to ON.
TEST OUT ZEBRA	OFF/ON	Turns ON/OFF the function to output the zebra pattern to the TEST OUT terminal.
TEST OUT TC	OFF/ON	Turns ON/OFF the function to output the TIME CODE to the TEST OUT terminal.
TEST OUT SELECT	ENC/R/G/B	Selects the video signal that is output from the TEST OUT terminal. The output signal returns to the ENC-signal without fail at power-on.

FUNCTION 1 Display (Setting the various functions)



```
? 03OFUNCTION 1
 ASSIGN SW <1>      :    ATW
 ASSIGN SW <2>      :    OFF

 DF/NDF             :     DF
 END SEARCH         :    OFF

 LOOP/INTVAL REC    :    OFF
```

Displays are switched in accordance with the setting of LOOP/INTVAL REC.

Item	Setting	Function
ASSIGN SW <1>	OFF : No function is assigned to this position. LOOPR*2 : LOOP REC function ON/OFF switch CHARA : Character mix to the TEST OUT terminal MARKR : Marker superimposition ON/OFF switch RTAKE : Executes RE-TAKE when pressed together with the RET switch at the same time. ATW : ATW (Automatic Tracking White-balance) function ON/OFF switch RET.V : Displays the return video signal on VF. RET : The same function as a Return switch of a lens. REC : VTR S/S (Start/Stop) switch TURBO : TURBO GAIN switch	Selects the functions of the ASSIGN1 switch. (Refer to Operation Manual for details.)
ASSIGN SW <2>	OFF : No function is assigned to this position. LOOPR*2 : LOOP REC function ON/OFF switch CHARA : Character mix to the TEST OUT terminal MARKR : Marker superimposition ON/OFF switch V.SRC*3 : CAM/EXT selection of composite in ZEBRA : ZEBRA display ON/OFF switch	Selects the functions of the ASSIGN2 switch. (Refer to Operation Manual for details.)
DF/NDF*1	DF/NDF	Sets DF/NDF. DF : Drop frame mode NDF : Non drop frame mode
END SEARCH	OFF/ON	END SEARCH function ON/OFF
LOOP/INTVAL REC*2	OFF/LOOP/A.INT/M.INT	Sets the LOOP REC function. OFF : Not used LOOP : LOOP REC A.INT : Auto INTerval recording M.INT : Manual INTerval recording

*1 : The DF/NDF menu is displayed only when the Camcoder is set to be NTSC.
*2 : It is displayed only when the MY-104 board (MSDW-903) is installed.
*3 : It is displayed only when the IV-55 board (MSDW-904) is installed.

When LOOP is selected in LOOP/INTVAL REC

```
LOOP/INTVAL REC  :  LOOP
LOOP REC TIME    :  0SEC
```

Item	Setting	Function
LOOP REC TIME	0SEC/1SEC/2SEC/3SEC/4SEC/ 5SEC/6SEC/8SEC	Sets the time of LOOP REC. (SEC: second.) (When 0 sec is set, Just REC is selected.) Displayed only when LOOP is selected in the above LOOP/INTVAL REC.

When A.INT is selected in LOOP/INTVAL REC

```
LOOP/INTVAL REC  :  A.INT
TAKE TOTAL TIME  :   5MIN
REC TIME         :   5SEC
PRE-LIGHTING     :    OFF
```

Item	Setting	Function
TAKE TOTAL TIME	5MIN/10MIN/15MIN/20MIN/ 30MIN/40MIN/50MIN/1H/2H/3H 4H/5H/7H/10H/15H/20H/30H/40H 50H/70H100H	Sets the total recording time of the Auto Interval REC. (MIN: minutes, H: hours) Displayed only when A.INT is selected in the above LOOP/INTVAL REC.
REC TIME	5SEC/10SEC/15SEC/20SEC/30SEC/ 40SEC/50SEC/1MIN to 72MIN (PAL), 60MIN (NTSC)	Sets the actual recording time of the Auto Interval REC. (SEC: seconds, MIN: minutes) Displayed only when A.INT is selected in the above LOOP/INTVAL REC.
PRE-LIGHTING	OFF/2SEC/5SEC/10SEC	Sets the function of turning on the light automatically during the Auto Interval REC. This is the function to set the timing how many seconds before starting recording, the light turns on. Displayed only when A.INT is selected in the afore-mentioned LOOP/INTVAL REC.

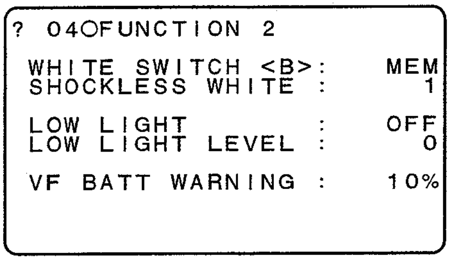
When M.INT is selected in LOOP/INTVAL REC

```
LOOP/INTVAL REC  : M.INT
NUMBER OF FRAME  :     1
TRIGGER INTERVAL:   5MIN
PRE-LIGHTING     :   OFF
```

Item	Setting	Function
NUMBER OF FRAME	1/2/4/8	Sets the number picture frames that are recorded by one time of recording in the Manual Interval REC. Displayed only when M.INT is selected in the above LOOP/INTVAL REC.
TRIGGER INTERVAL[*1]	M/1SEC/2SEC/3SEC/4SEC/5SEC/6SEC/7SEC/8SEC/9SEC/10SEC 20SEC/30SEC/40SEC/50SEC 1MIN/2MIN/3MIN/4MIN/5MIN/6MIN/7MIN/8MIN/9MIN/10MIN/15MIN/20MIN/30MIN/40MIN/50MIN/1H/2H/3H/4H/6H/12H/24H	Sets the interval time. When "M" is set, number of frames that are specified at the moment of pressing the REC switch manually, are recorded. When any specific time is set, numbers of the specified frames are recorded that is triggered by the REC switch.
PRE-LIGHTING	OFF/2SEC/5SEC/10SEC	Sets the function of turning on the light automatically during the Manual Interval REC. This is the function to set the timing how many seconds before starting recording, the light turns on. This item is displayed only when the A.INT is selected in the afore-mentioned LOOP/INTVAL REC,or when the M. INT is selected and the TRIGGER INTERVAL is other than "M".

*1 : This item is displayed only when the unit of which the ROM version of the AT board is 1.40 and higher. You can check the ROM version of the AT board by the ROM VERSION display in the DIAGNOSIS menu.

FUNCTION 2 Display (Setting the various functions)



```
? 04○FUNCTION 2

 WHITE SWITCH <B>:     MEM
 SHOCKLESS WHITE :       1

 LOW LIGHT       :     OFF
 LOW LIGHT LEVEL :       0

 VF BATT WARNING :     10%
```

Item	Setting	Function
WHITE SWITCH <B>	MEM/ATW	Sets the following modes when the WHITE BAL switch is set to the B (B-CH) position. ATW : Auto Tracing White-balance MEM : Automatic white balance
SHOCKLESS WHITE	OFF/1/2/3	Turns ON/OFF the function that smoothes out the transition of white balance when the WHITE BAL switch is operated. It also sets the transition time of white balance. 1 (fast) ↔ 3 (slow)
LOW LIGHT	OFF/ON	Turns ON/OFF the LOW LIGHT message display function. (it displays the warning message on screen when the average picture level decreases below a specific level.)
LOW LIGHT LEVEL	(−99 to 99)	Sets the video level to start displaying the LOW LIGHT message when the above LOW LIGHT message display function is ON. Reference : When a menu is being displayed on screen, the character "L" is displayed instead of the message "LOW LIGHT". (Example) LOW LIGHT LEVEL: L 0
VF BATT WARNING	10%/20%	Sets the battery terminal voltage to start displaying the battery alarm warning when using the Anton Bauer battery. 10%: Starts flashing when the battery terminal voltage reaches at about 0.67 V. 20%: Shows the 20% indication when the battery terminal voltage reaches at about 1.33 V and starts flashing when it reaches at about 1.0 V.

VF DISP 1 Display (Setting the VF displays)

```
? 05OVF  DISP  1

 VF  DISP              :      ON
 VF  DISPLAY  MODE     :       3
 DISP  EXTENDER        :      ON
 DISP  FILTER          :      ON
 DISP  WHITE           :      ON
 DISP  GAIN            :      ON
 DISP  SHUTTER         :      ON
 DISP  AUDIO           :      ON
 DISP  TAPE            :      ON
 DISP  IRIS            :      ON
```

Item	Setting	Function
VF DISP	OFF/ON	Turns ON/OFF the VF display items other than menu.
VF DISPLAY MODE	1/2/3	Turns ON/OFF the display mode. *1
DISP EXTENDER	OFF/ON	Turns ON/OFF the extender display.
DISP FILTER	OFF/ON	Turns ON/OFF the filter display.
DISP WHITE	OFF/ON	Turns ON/OFF the white balance memory display.
DISP GAIN	OFF/ON	Turns ON/OFF the gain setup value display.
DISP SHUTTER	OFF/ON	Turns ON/OFF the shutter speed display.
DISP AUDIO	OFF/ON	Turns ON/OFF the audio level display.
DISP TAPE	OFF/ON	Turns ON/OFF the remaining amount of tape display.
DISP IRIS	OFF/ON	Turns ON/OFF the lens iris value display.

*1: Regarding the messages that indicate the contents of setup change and the messages that indicate progress/result of adjustments, only a part of the display items can be selected or no display at all can also be selected by setting the display mode.

Correspondence between the conditions of the unit when the message is displayed and the display modes are shown as follows.
○ : Message is displayed.
× : Message is not displayed.

The conditions that necessitate showing of the message	Message	Display mode setting		
		1	2	3
When FILTER selection is changed.	FILTER : n (n = 1, 2, 3, 4)	×	×	○
When GAIN setting is changed.	GAIN : n (n = −3 dB, 0 dB, 3 dB, 6 dB, 9 dB, 12 dB, 18 dB, 24 dB, 30 dB, 36 dB, 42 dB, 48 dB)	×	×	○
When the WHITE BAL switch setting is changed.	WHITE : n (n = A CH, B CH, PRESET) or ATW (Auto Tracing White-balance) : RUN	×	×	○
When the OUTPUT/DCC switch is set to DCC ON or DCC OFF.	DCC : ON (or OFF)	×	○	○
When the shutter speed/shutter mode setting is changed.*2	SS : 1/100 (NTSC) ,1/60 (PAL) (or 1/125, 1/250, 1/500, 1/1000, 1/2000, ECS, EVS)	×	○	○
When BLACK balance/ WHITE balance adjustment is in progress.	example : WHITE : OK	×	○	○

*2 : It is also displayed for about 3 seconds when the SHUTTER switch is set to ON.

VF DISP 2 Display (Setting the VF displays)

```
? 06OVF  DISP  2

  DISP  ZOOM          :     ON
  DISP  COLOR  TEMP   :    OFF
  DISP  VOLT          :    OFF
  DISP  DC  IN        :    OFF
  DISP  16:9  ID      :    OFF
  DISP  WRR  RF  LVL  :    OFF

  DISP  TIME  CODE    :    OFF
```

Item	Setting	Function
DISP ZOOM	OFF/ON	Turns ON/OFF the zoom display.
DISP COLOR TEMP	OFF/ON	Turns ON/OFF the color temperature display.
DISP VOLT	OFF/ON	Turns ON/OFF the battery (or DC IN) voltage display.
DISP DC IN*1	OFF/ON	Turns ON/OFF the "DC IN" display on the VF when the setting is DC IN.
DISP 16 : 9 ID	OFF/ON	Turns ON/OFF the 16 : 9 display.
DISP WRR RF LVL	OFF/ON	Turns ON/OFF the wireless receiver RF level display.
DISP TIME CODE	OFF/ON	Turns ON/OFF the time-code display.

*1 : This item is displayed only when the unit of which the ROM version of the AT board is 1.40 and higher. You can check the ROM version of the AT board by the ROM VERSION display in the DIAGNOSIS menu.

'!' LED Display (Selecting the conditions to turn on the '!' indicator on VF)

```
? 07O'!'LED

  GAIN        <!>  :    ON
  SHUTTER     <!>  :    ON
  WHT PRESET  <!>  :    ON
  ATW RUN     <!>  :    ON
  EXTENDER    <!>  :    ON
  FILTER      <!>  :   OFF
  OVERRIDE    <!>  :    ON
```

Item	Setting	Function
GAIN <!>	OFF/ON	OFF : Does not turn on. ON : Turns on when GAIN is set to any position other than 0 dB.
SHUTTER <!>	OFF/ON	OFF : Does not turn on. ON : Turns on when the SHUTTER switch is set to ON.
WHT PRESET <!>	OFF/ON	OFF : Does not turn on. ON : Turns on when the WHITE BAL switch is set to PRST.
ATW RUN <!>	OFF/ON	OFF : Does not turn on. ON : Turns on when the ATW (Auto Tracing White-balance) is operating.
EXTENDER <!>	OFF/ON	OFF : Does not turn on. ON : Turns on when the lens extender is being used, or when 4: 3 shrinker is used in the 16: 9 mode.
FILTER <!>	OFF/ON	OFF : Does not turn on. ON : Turns on in the following conditions: FILTER is set in any position other than 1B. FILTER is set in any position other than 1 (single filter).
OVERRIDE <!>	OFF/ON	OFF : Does not turn on. ON : Turns on when the reference value of the auto IRIS control is set to any value other than the standard value.

MARKER 1 Display (Setting the MARKER)

```
? 08OMARKER 1
 MARKER                 :    OFF

 CENTER                 :    OFF
 SAFETY  ZONE           :    OFF
 SAFETY  AREA           :    90%
 ASPECT                 :    OFF
 ASPECT  SELECT         :    4:3
 ASPECT  MASK (4:3)     :    OFF
 ASPECT  MASK  LVL      :    1/4
 100% MARKER            :    OFF
```

Item	Setting	Function
MARKER	OFF/ON	Turns ON/OFF all the MARKER display function.
CENTER	OFF/ON	Turns ON/OFF the CENTER MARKER display.
SAFETY ZONE	OFF/ON	Turns ON/OFF the SAFETY ZONE MARKER display.
SAFETY AREA	80/90/92.5/95	Selects the ranges of the SAFETY ZONE MARKER display.
ASPECT	OFF/ON	Turns ON/OFF the ASPECT MARKER display.
ASPECT SELECT	14 : 9/13 : 9/4 : 3	Select the aspect ratio.
ASPECT MASK (4:3)	OFF/ON	Turns ON/OFF the function to darken the outside of the specified aspect. **Note** This setting is effective in the VF output only.
ASPECT MASK LVL	1/2, 1/4, 1/8	Selects the darkness level of the outside of the specified aspect when ASPECT MASK is ON. **Note** This setting is effective in the VF output only.
100% MARKER	OFF/ON	Turns ON/OFF the 100% (effective picture elements) MARKER display.

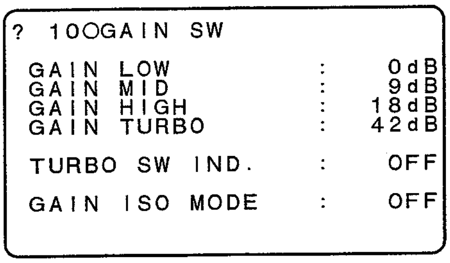
MARKER 2 Display (Setting the MARKER-related items)

```
? 09OMARKER 2
 USER  BOX              :    OFF
 USER  BOX  WIDTH       :    245
 USER  BOX  HEIGHT      :     72
 USER  BOX  H  POS.     :      0
 USER  BOX  V  POS.     :      0

 CENTER  H  POS.        :      0
 CENTER  V  POS.        :      0
```

Item	Setting	Function
USER BOX	OFF/ON	Turns ON/OFF the BOX cursor display.
USER BOX WIDTH	1 to 465	Sets the horizontal width of the BOX cursor.
USER BOX HEIGHT	1 to 120 (NTSC) 1 to 142 (PAL)	Sets the vertical width of the BOX cursor.
USER BOX H POS.	–466 to 465 *1	Sets the BOX cursor position (horizontal position).
USER BOX V POS.	–120 to 119*1 (NTSC) –142 to 142*1 (PAL)	Sets the BOX cursor position (vertical position).
CENTER H POS.	–466 to 465	Sets the CENTER MARKER position (horizontal position).
CENTER V POS.	–121 to 120 (NTSC) –143 to 143 (PAL)	Sets the CENTER MARKER position (vertical position).

*1 : Range of this setting is different depending upon the above USER BOX WIDTH/HEIGHT setting.

GAIN SW Display (Setting GAIN)

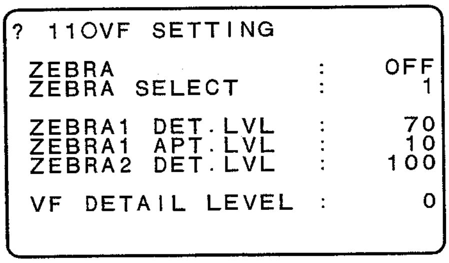


```
? 100GAIN SW

 GAIN LOW          :    0dB
 GAIN MID          :    9dB
 GAIN HIGH         :   18dB
 GAIN TURBO        :   42dB

 TURBO SW IND.     :    OFF

 GAIN ISO MODE     :    OFF
```

Item	Setting	Function
GAIN LOW	–3/0/3/6/9/12/18/24/30/36/42/48	Sets the gain value when the GAIN switch is set to the "L" position.
GAIN MID	–3/0/3/6/9/12/18/24/30/36/42/48	Sets the gain value when the GAIN switch is set to the "M" position.
GAIN HIGH	–3/0/3/6/9/12/18/24/30/36/42/48	Sets the gain value when the GAIN switch is set to the "H" position.
GAIN TURBO	–3/0/3/6/9/12/18/24/30/36/42/48	Sets the gain value the TURBO GAIN switch.
TURBO SW IND.	OFF/ON	Turns ON/OFF the function that disables L/M/H of the GAIN switch while the TURBO GAIN is being selected.
GAIN ISO MODE*1	OFF/ON	Turns ON/OFF the function that sets the GAIN value in the ISO indication. ON : ISO indication OFF : Decibel (dB) indication **Note** Correspondence between the ISO indication and decibel (dB) indication is shown below. Values in parenthesis ( ) indicates the decibel (dB) indication. 530 (–3) /760 (0) / 1070 (3) / 1510 (6) / 2140 (9) / 3030 (12) / 6050 (18) / 12100 (24) / 24200 (30) / 48400 (36) / 96800 (42) / 194000 (48)

*1 : This item is displayed only when the unit of which the ROM version of the AT board is 1.50 and higher. You can check the ROM version of the AT board by the ROM VERSION display in the DIAGNOSIS menu.

VF SETTING display (Setting VF)



```
? 110VF SETTING
 ZEBRA              :  OFF
 ZEBRA SELECT       :    1

 ZEBRA1 DET.LVL     :   70
 ZEBRA1 APT.LVL     :   10
 ZEBRA2 DET.LVL     :  100

 VF DETAIL LEVEL    :    0
```

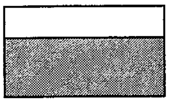
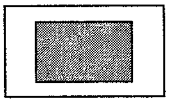
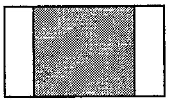
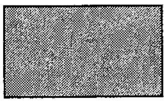
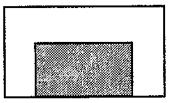
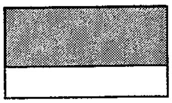
Item	Setting	Function
ZEBRA	OFF/ON	Turns ON/OFF all the zebra display.
ZEBRA SELECT	1/2/BOTH	Selects the zebra pattern type.
ZEBRA1 DET.LVL	(20 to 107)	Sets the ZEBRA1 display level (center value).
ZEBRA1 APT.LVL	(1 to 20)	Sets the display width of ZEBRA1.
ZEBRA2 DET.LVL	(52 to 109)	Sets the ZEBRA2 display level (lower limit value).
VF DETAIL LEVEL	(–99 to 99)	Sets the V. details of the VF picture. (Details of the main line video output remain unchanged.)

AUTO IRIS Display (Setting AUTO IRIS)

```
? 12OAUTO  IRIS

  IRIS OVERRIDE      :     OFF
  IRIS SPEED         :       2
 CLIP HIGH LIGHT     :     OFF

  IRIS WINDOW        :       1
  IRIS WINDOW IND.   :     OFF
  IRIS VAR WIDTH     :     245
  IRIS VAR HEIGHT    :      72
  IRIS VAR H POS.    :       0
  IRIS VAR V POS.    :       0
```

Item	Setting	Function
IRIS OVERRIDE	OFF/ON	Turns ON/OFF the AUTO IRIS OVERRIDE function. When set to ON, the reference value of the AUTO IRIS can be changed by the rotary encoder. (5 steps: −1, −0.5, 0, +0.5, +1)
IRIS SPEED	0/1/2/3/4/5	Sets the AUTO IRIS response speed. 0 (Fast) ↔ 5 (Slow)
CLIP HIGH LIGHT	OFF/ON	Turns ON/OFF the function that limits the AUTO IRIS detection level to 100% when the video signal of higher than 100% is input.
IRIS WINDOW	1/2/3/4/5/6/VAR	Selects the IRIS WINDOW (detection range). *1 When VAR is selected, the iris window can be set by the IRIS VAR WIDTH/HEIGHT/H POS/V POS as described below.
IRIS WINDOW IND.	OFF/ON	Turns ON/OFF the function that checks the iris window with the box cursor.
IRIS VAR WIDTH	20 to 465	Sets width of the iris window when VAR is selected in the above IRIS WINDOW.
IRIS VAR HEIGHT	20 to 120 (NTSC) 20 to 142 (PAL)	Sets height of the iris window when VAR is selected in the above IRIS WINDOW.
IRIS VAR H POS	−452 to 452 (NTSC) *2 −447 to 448 (PAL) *2	Sets the center in the vertical direction of the iris window when VAR is selected in the above IRIS WINDOW.
IRIS VAR V POS	−101 to 100 (NTSC) *2 −123 to 123 (PAL) *2	Sets the center in the horizontal direction of the iris window when VAR is selected in the above IRIS WINDOW.

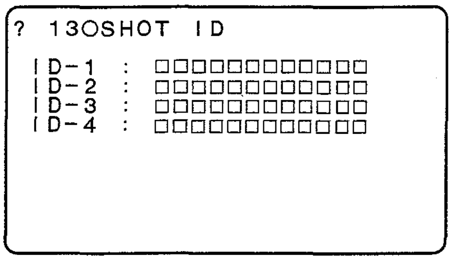
*1 : The IRIS WINDOW is set as shown below.

Setting	1	2	3	4	5	6
VF screen						

Shaded (▨) area : IRIS WINDOW frame

*2 : Range of this setting is different depending upon the above IRIS VAR WIDTH/HEIGHT setting.

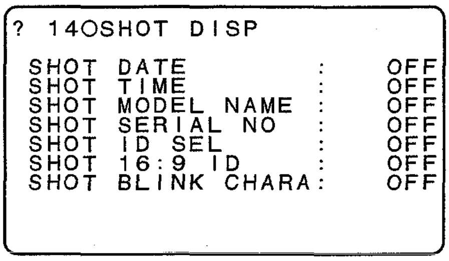
SHOT ID Display (Setting SHOT ID)



```
? 13OSHOT  ID
 ID-1  :  □□□□□□□□□□□□
 ID-2  :  □□□□□□□□□□□□
 ID-3  :  □□□□□□□□□□□□
 ID-4  :  □□□□□□□□□□□□
```

Item	Setting	Function
ID-1	12 characters (alphanumeric characters, symbols and spaces)	Setting SHOT ID-1
ID-2	12 characters (alphanumeric characters, symbols and spaces)	Setting SHOT ID-2
ID-3	12 characters (alphanumeric characters, symbols and spaces)	Setting SHOT ID-3
ID-4	12 characters (alphanumeric characters, symbols and spaces)	Setting SHOT ID-4

SHOT DISP Display (Selecting the shot data to be superimposed on color bar)

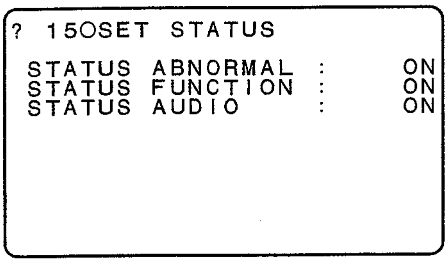


```
? 14OSHOT  DISP
 SHOT DATE          :   OFF
 SHOT TIME          :   OFF
 SHOT MODEL NAME    :   OFF
 SHOT SERIAL NO     :   OFF
 SHOT ID SEL        :   OFF
 SHOT 16:9 ID       :   OFF
 SHOT BLINK CHARA   :   OFF
```

Item	Setting	Function
SHOT DATA	OFF/ON	Turns ON/OFF the date display.
SHOT TIME	OFF/ON	Turns ON/OFF the time display.
SHOT MODEL NAME	OFF/ON	Turns ON/OFF the model name display of this unit.
SHOT SERIAL NO	OFF/ON	Turns ON/OFF the serial number display of this unit.
SHOT ID SEL	OFF/ID-1/ID-2/ID-3/ID-4	Displays the SHOT ID number that is selected by the SHOT ID page.
SHOT 16 : 9 ID	OFF/ON	Turns ON/OFF the 16: 9 ID display of the main signal line.
SHOT BLINK CHARA*1	OFF/ON	Turns ONN/OFF the blinking of the asterisk "*" on the color bar.

*1 : This item is displayed only when the unit of which the ROM version of the AT board is 1.40 and higher. You can check the ROM version of the AT board by the ROM VERSION display in the DIAGNOSIS menu.

SET STATUS Display (Selecting the status check display page that appears when the STATUS ON/SEL/OFF switch is operated)

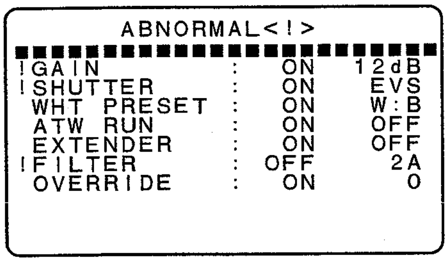


```
? 15OSET STATUS

 STATUS ABNORMAL :     ON
 STATUS FUNCTION :     ON
 STATUS AUDIO    :     ON
```

Item	Setting	Function
STATUS ABNORMAL	OFF/ON	Turns ON/OFF the ABNORMAL <!> screen display.
STATUS FUNCTION	OFF/ON	Turns ON/OFF the FUNCTION screen display.
STATUS AUDIO	OFF/ON	Turns ON/OFF the AUDIO STATUS screen display.

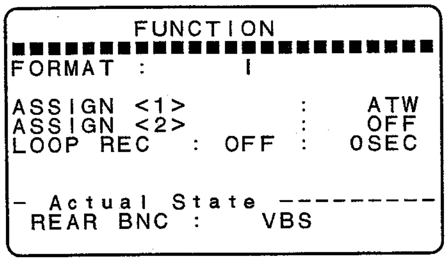
*1 : The status display screens are shown as follows.

ABNORMAL <!> display (Indicating the conditions to turn on the Abnormal LED <!> that is set by the <!> LED display)



```
       ABNORMAL<!>
■■■■■■■■■■■■■■■■■■■■■■■■■
!GAIN        :  ON   12dB
!SHUTTER     :  ON    EVS
 WHT PRESET  :  ON    W:B
 ATW RUN     :  ON    OFF
 EXTENDER    :  ON    OFF
!FILTER      : OFF     2A
 OVERRIDE    :  ON      0
```

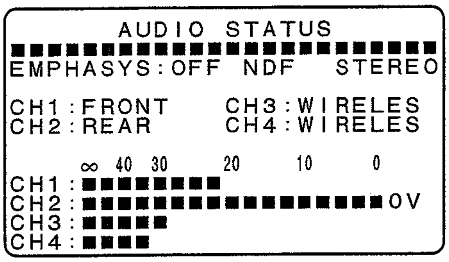
FUNCTION display (Indicating the setup status of the various function that are set by the FUNCTION display)



```
        FUNCTION
■■■■■■■■■■■■■■■■■■■■■■■■■
FORMAT :      I

ASSIGN <1>         :  ATW
ASSIGN <2>         :  OFF
LOOP REC   : OFF   : 0SEC

- Actual State ---------
 REAR BNC :     VBS
```

Item	Function
FORMAT	Displays the present format.
ASSIGN <1>	Displays the function that is assigned to the ASSIGN1 switch.
ASSIGN <2>	Displays the function that is assigned to the ASSIGN2 switch.
LOOP REC	Displays the ON/OFF status of the LOOP REC function. (Only when the LOOP REC board MY-104 (MSDW-903) is installed.)
<Actual State> REAR BNC	Displays the output status of the various BNC connectors.

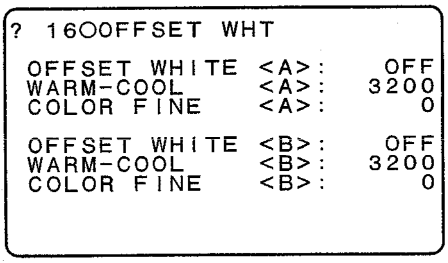
AUDIO STATUS Display (Indicating the setup status on audio)



```
         AUDIO  STATUS
■■■■■■■■■■■■■■■■■■■■■■■■
EMPHASYS:OFF  NDF   STEREO

CH1:FRONT     CH3:WIRELES
CH2:REAR      CH4:WIRELES

     ∞  40  30     20     10     0
CH1:■■■■■■■■
CH2:■■■■■■■■■■■■■■■■■■0V
CH3:■■■■■
CH4:■■■■
```

Item	Function
EMPHASYS	Displays the EMPHASIS, DF/NDF, and FRONT MIC MONO/STEREO setting.
CH1 CH2 CH3 CH4	Displays the input signals of CH1 to CH4.
CH1 CH2 CH3 CH4	Displays the input signal level of CH1 to CH4. (When the input signal overflows, 0 V is displayed.)

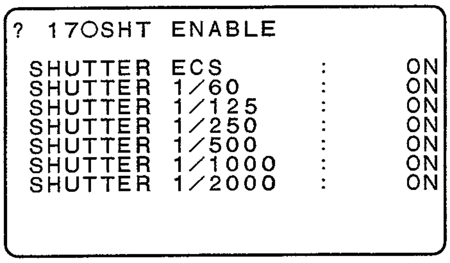
OFFSET WHT Display (Setting on the offset white function)



```
? 160OFFSET WHT
  OFFSET WHITE  <A>:    OFF
  WARM-COOL     <A>:   3200
  COLOR FINE    <A>:      0

  OFFSET WHITE  <B>:    OFF
  WARM-COOL     <B>:   3200
  COLOR FINE    <B>:      0
```

Item	Setting	Function
OFFSET WHITE <A>	OFF/ON	Turns ON/OFF the offset white function. (A-CH) Note : If the white balance auto adjustment is not performed, the following settings are not reflected.
WARM-COOL <A>	Displays the color temperature (Guideline)	Sets the offset value. (A-CH)
COLOR FINE <A>	(−99 to 99)	Used for the above WARM-COOL fine adjustment. (A-CH)
OFFSET WHITE <B>	OFF/ON	Turns ON/OFF the offset white function. (B-CH) Note : If the white balance auto adjustment is not performed, the following settings are not reflected.
WARM-COOL <B>	Displays the color temperature (Guideline)	Sets the offset value. (B-CH)
COLOR FINE <B>	(−99 to 99)	Used for the above WARM-COOL fine adjustment. (B-CH)

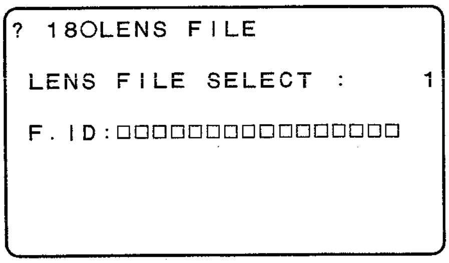
SHT ENABLE Display (Setting the shutter mode/speed that can be selected by the SHUTTER switch)



```
? 17OSHT ENABLE
 SHUTTER ECS      :    ON
 SHUTTER 1/60     :    ON
 SHUTTER 1/125    :    ON
 SHUTTER 1/250    :    ON
 SHUTTER 1/500    :    ON
 SHUTTER 1/1000   :    ON
 SHUTTER 1/2000   :    ON
```

Item	Setting	Function
SHUTTER ECS	OFF/ON	Turns ON/OFF the ECS mode.
SHUTTER 1/60	OFF/ON	Selects the shutter speed of 1/100 (NTSC), 1/60 (PAL) of the standard speed.
SHUTTER 1/125	OFF/ON	Selects the shutter speed of 1/125 of the standard speed.
SHUTTER 1/250	OFF/ON	Selects the shutter speed of 1/250 of the standard speed.
SHUTTER 1/500	OFF/ON	Selects the shutter speed of 1/500 of the standard speed.
SHUTTER 1/1000	OFF/ON	Selects the shutter speed of 1/1000 of the standard speed.
SHUTTER 1/2000	OFF/ON	Selects the shutter speed of 1/2000 of the standard speed.

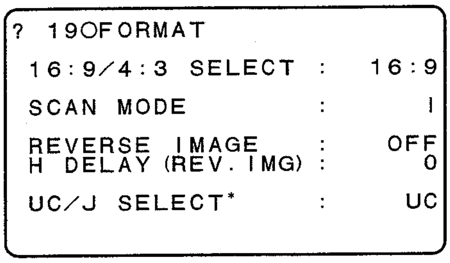
LENS FILE Display (Operating the LENS file)



```
? 18OLENS FILE

 LENS FILE SELECT :     1

 F.ID:□□□□□□□□□□□□□□□□
```

Item	Setting	Function
LENS FILE SELECT	1/2/3/4/5	Selects the LENS file.
F.ID	Display only	Displays the file ID of the LENS file that is selected by the above LENS FILE SELECT.

FORMAT Display (Setting of the format)



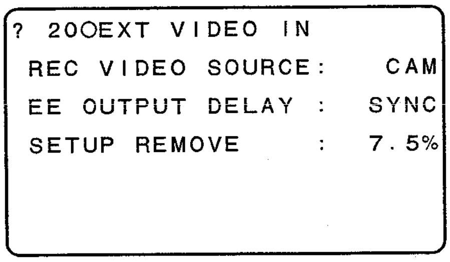
```
? 19OFORMAT
 16:9/4:3 SELECT  :   16:9
 SCAN MODE        :      I
 REVERSE IMAGE    :    OFF
 H DELAY (REV.IMG):      0
 UC/J SELECT*     :     UC
```

∗ : It is displayed only when the Camcoder is set to be NTSC.

Item	Setting	Function
16 : 9/4 : 3 SELECT	16 : 9/4 : 3	Selects whether to cut out the picture of the aspect ratio 4 : 3 or not.
SCAN MODE	I/PsF	Selects either interlace (I) or progressive segmented frame (PsF) of the scan mode.
REVERSE IMAGE	OFF/ON	Turning ON/OFF of picture reversal.
H DELAY (REV.IMG)	−6 to 6	Corrects the reversal picture in horizontal direction.
UC/J SELECT*	UC/J	Selects either UC or J.

EXT VIDEO IN Display∗1 (Setting function of video input)

∗1 : This menu is displayed only when the COMPOSITE VIDEO INPUT board IV-55 (MSDW-904) is installed.



```
? 20OEXT VIDEO IN
 REC VIDEO SOURCE:  CAM
 EE OUTPUT DELAY :  SYNC
 SETUP REMOVE    :  7.5%
```

Item	Setting	Function
REC VIDEO SOURCE	CAM/EXT	CAM : Records the video signal that the camera is shooting. EXT : Records the video signal supplied from external equipment connected to the GENLOCK IN terminal.
EE OUTPUT DILAY	SYNC/VIDEO	Selects delay amount of the video signal that is output from TET OUT or VIDEO OUT terminal when the above REC VDEO SOURCE is set to EXT. SYNC : The video output signal and vertical sync signal are output with the delay of 8 horizontal lines with respect to video input signal. VIDEO : Only the video output signal is delayed by 8 horizontal lines after video input signal. (For details, refer to "3-5. Recording Video Signals from External Equipment – Selecting the delay mode of the vertical synchronizing (V sync) signal of the output video signal".) in the Operation Manual.
SETUP REMOVE∗2	0 to 10.0 %	The SETUP level to be removed. Adjust the SETUP REMOVE level in accordance with the setup level of the input video signal.

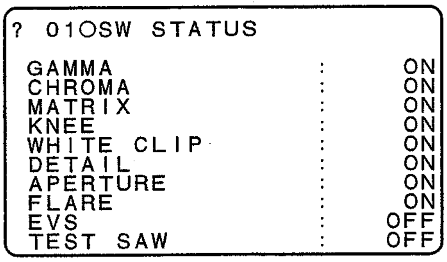
∗2 : It is displayed only when UC is selected in the item UC/J SELECT on the 19OFORMAT display in the NTSC mode.-5

4-5. PAINT Menu

Note

When the range of setting is surrounded by parenthesis ( ) in the setting column, the setup value is the relative value. The range of setting in parenthesis ( ) can be different from what shown in the manual depending on the setting in the layer lower than this menu.

SW STATUS Display (Turns ON/OFF the PAINT related functions)

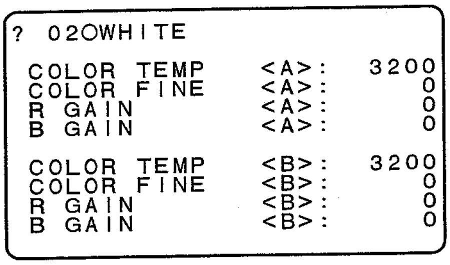


```
? 01OSW STATUS

 GAMMA              :    ON
 CHROMA             :    ON
 MATRIX             :    ON
 KNEE               :    ON
 WHITE CLIP         :    ON
 DETAIL             :    ON
 APERTURE           :    ON
 FLARE              :    ON
 EVS                :   OFF
 TEST SAW           :   OFF
```

← It is to be OFF only when J is selected in the item UC/J SELECT on the 19OFORMAT display in the NTSC mode.

Item	Setting	Function
GAMMA	OFF/ON	Turns ON/OFF the gamma correction function.
CHROMA	OFF/ON	Turns ON/OFF the function that adds the CHROMA signal.
MATRIX	OFF/ON	Turns ON/OFF the linear matrix and multi matrix functions.
KNEE	OFF/ON	Turns ON/OFF the knee correction function.
WHITE CLIP	OFF/ON	Turns ON/OFF the white clip correction function.
DETAIL	OFF/ON	Turns ON/OFF the function that adds the detail signal to the video signal to improve resolution power.
APERTURE	OFF/ON	Turns ON/OFF the aperture correction function.
FLARE	OFF/ON	Turns ON/OFF the flare correction circuit.
EVS	OFF/ON	Turns ON/OFF the EVS (enhanced vertical resolution) mode.
TEST SAW	OFF/ON	Turns ON/OFF the function that outputs the TEST signal forcibly to the video signal system.

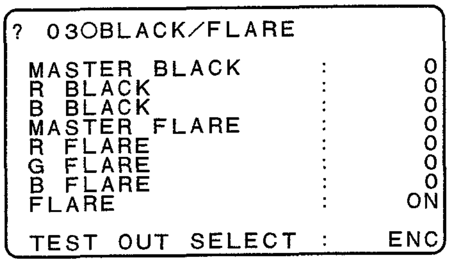
WHITE Display (Setting color temperature at WHITE A/B)



```
? 020WHITE
 COLOR TEMP   <A>:   3200
 COLOR FINE   <A>:      0
 R GAIN       <A>:      0
 B GAIN       <A>:      0

 COLOR TEMP   <B>:   3200
 COLOR FINE   <B>:      0
 R GAIN       <B>:      0
 B GAIN       <B>:      0
```

Item	Setting	Function
COLOR TEMP <A>	Displays the color temperature (Guideline)	Sets the value that is close to the color temperature of your preference. (The displayed value is a guideline.) Reference : The R GAIN and B GAIN values also change accordingly at the same time. When data of the color temperature display is more than 100000K, ****** appears.
COLOR FINE <A>	(–99 to 99)	Uses this item for fine adjustment when the optimum color cannot be obtained by the above COLOR TEMP. Reference : The R GAIN and B GAIN values also change accordingly at the same time.
R GAIN <A>	(–99 to 99)	Uses this item when you want to adjust the color temperature by changing the R GAIN.
B GAIN <A>	(–99 to 99)	Uses this item when you want to adjust the color temperature by changing the B GAIN.
COLOR TEMP <B>	Displays the color temperature (Guideline)	Sets the value that is close to the color temperature of your preference. (The displayed value is a guideline.) Reference : The R GAIN and B GAIN values also change accordingly at the same time. When data of the color temperature display is more than 100000K, ****** appears.
COLOR FINE <B>	(–99 to 99)	Uses this item for fine adjustment when the optimum color cannot be obtained by the above COLOR TEMP. Reference : The R GAIN and B GAIN values also change accordingly at the same time.
R GAIN <B>	(–99 to 99)	Uses this item when you want to adjust the color temperature by changing the R GAIN.
B GAIN <B>	(–99 to 99)	Uses this item when you want to adjust the color temperature by changing the B GAIN.

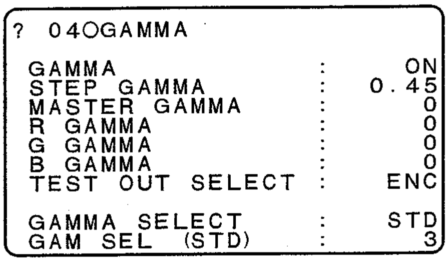
BLACK/FLARE Display (Adjusting black/flare)



```
? 03OBLACK/FLARE
 MASTER BLACK      :     0
 R BLACK           :     0
 B BLACK           :     0
 MASTER FLARE      :     0
 R FLARE           :     0
 G FLARE           :     0
 B FLARE           :     0
 FLARE             :    ON

 TEST OUT SELECT   :   ENC
```

Item	Setting	Function
MASTER BLACK	(−99 to 99)	Adjusts the master black level. (All of the R G and B black levels are adjusted.)
R BLACK	(−99 to 99)	Adjusts the R black level.
B BLACK	(−99 to 99)	Adjusts the B black level.
MASTER FLARE	(−99 to 99)	Adjusts the master flare compensation level. (All of the R G and B flare compensation levels are adjusted.)
R FLARE	(−99 to 99)	Adjusts the R flare compensation level.
G FLARE	(−99 to 99)	Adjusts the G flare compensation level.
B FLARE	(−99 to 99)	Adjusts the B flare compensation level.
FLARE	OFF/ON	Turns ON/OFF the flare compensation circuit.
TEST OUT SELECT	ENC/R/G/B	Selects the video signal that is output from the TEST OUT terminal. The output signal returns to the ENC-signal without fail at power-on.

GAMMA Display (Adjusting gamma)

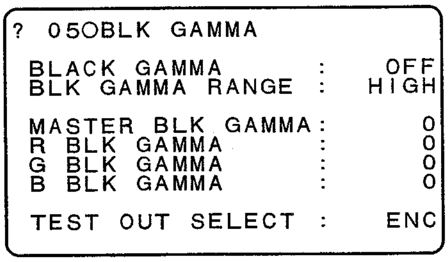


```
? 040GAMMA

 GAMMA                :     ON
 STEP GAMMA           :   0.45
 MASTER GAMMA         :      0
 R GAMMA              :      0
 G GAMMA              :      0
 B GAMMA              :      0
 TEST OUT SELECT      :    ENC

 GAMMA SELECT         :    STD
 GAM SEL  (STD)       :      3
```

Displays are switched in accordance with the setting of GAMMA SELECT

Item	Setting	Function
GAMMA	OFF/ON	Turns ON/OFF the gamma correction function.
STEP GAMMA	0.35/0.40/0.45/0.50/0.55/0.60/ 0.65/0.70/0.75/0.80/0.85/0.90	Sets the step gamma value.
MASTER GAMMA	(−99 to 99)	Adjusts the master gamma correction curve.
R GAMMA	(−99 to 99)	Adjusts the R gamma correction curve.
G GAMMA	(−99 to 99)	Adjusts the G gamma correction curve.
B GAMMA	(−99 to 99)	Adjusts the B gamma correction curve.
TEST OUT SELECT	ENC/R/G/B	Selects the video signal that is output from the TEST OUT terminal. The output signal returns to the ENC-signal without fail at power-on.
GAMMA SELECT	STD/FILM	Selects the types of the gamma.
GAM SEL (STD)	1 to 6	Selects the gamma curve of STD.
GAM SEL (FILM)	1 to 5	Selects the gamma curve of FILM.

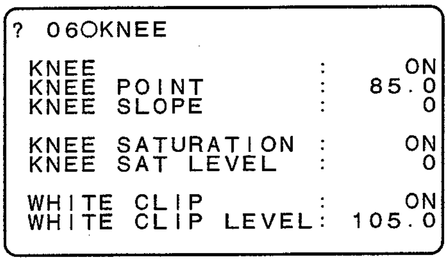
BLK GAMMA Display (Adjusting black gamma)



```
? 050BLK GAMMA

 BLACK GAMMA          :    OFF
 BLK GAMMA RANGE      :   HIGH

 MASTER BLK GAMMA     :      0
 R BLK GAMMA          :      0
 G BLK GAMMA          :      0
 B BLK GAMMA          :      0

 TEST OUT SELECT      :    ENC
```

Item	Setting	Function
BLACK GAMMA	OFF/ON	Turns ON/OFF the black gamma correction function.
BLK GAMMA RANGE	LOW/L.MID/H.MID/HIGH	Sets the range in which the black gamma correction is effective. LOW : 0 to 3.6 % L.MID : 0 to 7.2 % H.MID :0 to 14.4 % HIGH : 0 to 28.8 %
MASTER BLK GAMMA	(−99 to 99)	Adjusts the master black gamma correction curve.
R BLK GAMMA	(−99 to 99)	Adjusts the R black gamma correction curve.
G BLK GAMMA	(−99 to 99)	Adjusts the G black gamma correction curve.
B BLK GAMMA	(−99 to 99)	Adjusts the B black gamma correction curve.
TEST OUT SELECT	ENC/R/G/B	Selects the video signal that is output from the TEST OUT terminal. The output signal returns to the ENC-signal without fail at power-on.

KNEE Display (Adjusting knee)

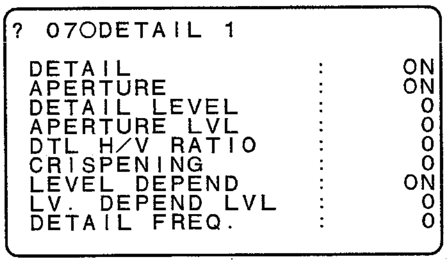


```
? 06OKNEE

 KNEE                :     ON
 KNEE  POINT         :   85.0
 KNEE  SLOPE         :      0

 KNEE  SATURATION    :     ON
 KNEE  SAT  LEVEL    :      0

 WHITE  CLIP         :     ON
 WHITE  CLIP  LEVEL  :  105.0
```

← 105.0 (for PAL), 109.0 (for NTSC)

Item	Setting	Function
KNEE	OFF/ON	Turns ON/OFF the knee correction function.
KNEE POINT	50 to 109 (%)	Adjusts the master knee point level during the manual knee adjustment.
KNEE SLOPE	(−99 to 99)	Adjusts the master knee slope level during the manual knee adjustment.
KNEE SATURATION	OFF/ON	Turns ON/OFF the knee saturation function.
KNEE SAT LEVEL	(−99 to 99)	Adjust the knee saturation level.
WHITE CLIP	OFF/ON	Turns ON/OFF the white clip function. Note : The video level that is higher than 109% is not output even if this setting is set to OFF.
WHITE CLIP LEVEL	100.0 to 109.5 (%)	Set the master white clip level.

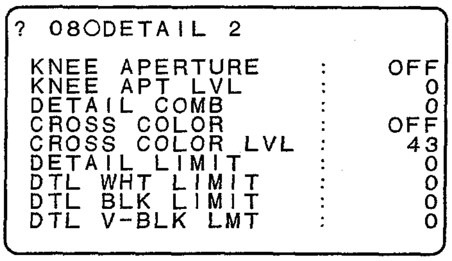
DETAIL 1 Display (Adjusting DETAIL 1)



```
? 07ODETAIL  1

 DETAIL             :   ON
 APERTURE           :   ON
 DETAIL  LEVEL      :    0
 APERTURE  LVL      :    0
 DTL  H/V  RATIO    :    0
 CRISPENING         :    0
 LEVEL  DEPEND      :   ON
 LV.  DEPEND  LVL   :    0
 DETAIL  FREQ.      :    0
```

Item	Setting	Function
DETAIL	OFF/ON	Turns ON/OFF the detail signal.
APERTURE	OFF/ON	Turns ON/OFF the aperture correction function.
DETAIL LEVEL	(−99 to 99)	Sets the overall detail signal level.
APERTURE LVL	(−99 to 99)	Sets the aperture correction level.
DTL H/V RATIO	(−99 to 99)	Sets the V. detail signal level only.
CRISPENING	(−99 to 99)	Sets the range of video signal amplitude to which the detail signal is crispened.
LEVEL DEPEND	OFF/ON	Turns ON/OFF the level depend function. (This function decreases the amount of detail signal when the video signal amplitude is small.)
LV. DEPEND LVL	(−99 to 99)	Sets the range of video signal amplitude that is suppressed by the level depend.
DETAIL FREQ.	(−99 to 99)	Sets the frequency (thickness) of the H. detail signal.

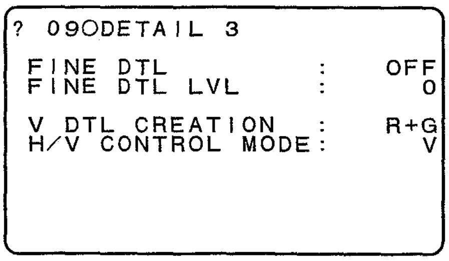
DETAIL 2 Display (Adjusting DETAIL 2)



```
? 08ODETAIL 2
 KNEE APERTURE     :   OFF
 KNEE APT LVL      :     0
 DETAIL COMB       :     0
 CROSS COLOR       :   OFF
 CROSS COLOR LVL   :    43
 DETAIL LIMIT      :     0
 DTL WHT LIMIT     :     0
 DTL BLK LIMIT     :     0
 DTL V-BLK LMT     :     0
```

Item	Setting	Function
KNEE APERTURE	OFF/ON	Turns ON/OFF the knee aperture function. (This function controls the amount of the detail signal that is added to the highlight signal higher than the knee point.)
KNEE APT LVL	(−99 to 99)	Adjusts the amount of the detail signal that is added to the highlight signal higher than the knee point.
DETAIL COMB	−99 to 0	Adjusts the comb filter level for the detail signal.
CROSS COLOR	OFF/ON	Turns ON/OFF the cross-color suppression for the main signal line.
CROSS COLOR LVL	0 to 99	Adjusts the cross-color suppression for the main signal line.
DETAIL LIMIT	(−99 to 99)	Limits the peaks of the detail signal.
DTL WHT LIMIT	(−99 to 99)	Limits the white peak of the detail signal.
DTL BLK LIMIT	(−99 to 99)	Limits the black peak of the detail signal.
DTL V-BLK LMT	(−99 to 99)	Limits the black peak of the V. detail signal.

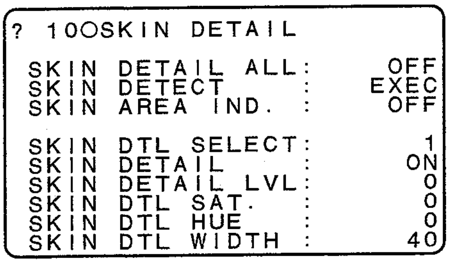
DETAIL 3 Display (Adjusting DETAIL 3)



```
? 09ODETAIL 3
 FINE DTL          :   OFF
 FINE DTL LVL      :     0

 V DTL CREATION    :   R+G
 H/V CONTROL MODE  :     V
```

Item	Setting	Function
FINE DTL	OFF/ON	Turns ON/OFF the FINE DETAIL function.
FINE DTL LVL	(−99 to 99)	Adjusts the amount of the finer detail signal.
V DTL CREATION	NAM/G/R+G/Y	Selects the source signal from which the V-detail signal is created.
H/V CONTROL MODE	H/V / V	Selects to control either both H and V details in synchronism or only V details when controlling DTL H/V RATIO from the DTL H/V RATIO menu.

SKIN DETAIL Display (Controlling DETAIL of specific color such as skin tone)



```
? 100SKIN DETAIL
 SKIN DETAIL ALL:    OFF
 SKIN DETECT    :   EXEC
 SKIN AREA IND. :    OFF

 SKIN DTL SELECT:      1
 SKIN DETAIL    :     ON
 SKIN DETAIL LVL:      0
 SKIN DTL SAT.  :      0
 SKIN DTL HUE   :      0
 SKIN DTL WIDTH :     40
```

Item	Setting	Function
SKIN DETAIL ALL[*1]	OFF/ON	Turns ON/OFF the skin detail function.
SKIN DETECT	Press the rotary encoder to execute this menu item	Automatic color detection function. Move the cursor to the desired object color and press the rotary encoder. Then the SKIN DTL SAT.and the SKIN DTL HUE will be set automatically.
SKIN AREA IND.	OFF/ON	Turns ON/OFF the zebra display to the target area.
SKIN DTL SELECT[*1]	1/2/3	Selects the skin detail BANK. (When BANK is switched, the lower 5 lines of display are switched at the same time.)
SKIN DETAIL[*1]	OFF/ON	Turns ON/OFF the skin detail function. ON/OFF can be set to each BANK (3 different settings) of the above SKIN DTL SELECT.
SKIN DETAIL LVL	(−99 to 99)	Sets the skin detail signal level. (Increasing this value increases the skin detail signal amplitude.) ON/OFF can be set to each BANK (3 different settings) of the above SKIN DTL SELECT.
SKIN DTL SAT.	(−99 to 99)	Sets the range of (saturation) of chroma signal in which the skin detail signal is effective. ON/OFF can be set to each BANK (3 different settings) of the above SKIN DTL SELECT.
SKIN DTL HUE	0 to 359	Sets the center phase of the chroma phase (HUE) in which the skin detail functions (Unit: Degrees) ON/OFF can be set to each BANK (3 different settings) of the above SKIN DTL SELECT.
SKIN DTL WIDTH	0 to 359	Sets the width of the chroma phase (HUE) in which the skin detail functions (Unit: Degrees) ON/OFF can be set to each BANK (3 different settings) of the above SKIN DTL SELECT.

[*1] :Setting of the SKIN DTL SELECT is effective when both the SKIN DETAIL ALL and SKIN DETAIL are set to ON.

MTX LINEAR Display (Setting linear matrix)

```
? 11○MTX LINEAR

 MATRIX                  :      ON
 MATRIX  (USER)          :     OFF
 MATRIX  (PRESET)        :      ON

 MATRIX (USER)  G-R :            0
 MATRIX (USER)  B-R :            0
 MATRIX (USER)  R-G :            0
 MATRIX (USER)  B-G :            0
 MATRIX (USER)  R-B :            0
 MATRIX (USER)  G-B :            0
```

← It is to be OFF only when J is selected in the item UC/J SELECT on the 19○FORMAT display in the NTSC mode.

Item	Setting	Function
MATRIX	OFF/ON	Turns ON/OFF the linear matrix and multi matrix functions.
MATRIX (USER)	OFF/ON	Turns ON/OFF the linear matrix function.
MATRIX (PRESET)	OFF/ON	Turns ON/OFF the preset matrix.
MATRIX (USER) G-R	(−99 to 99)	Sets the matrix coefficients.
MATRIX (USER) B-R	(−99 to 99)	Sets the matrix coefficients.
MATRIX (USER) R-G	(−99 to 99)	Sets the matrix coefficients.
MATRIX (USER) B-G	(−99 to 99)	Sets the matrix coefficients.
MATRIX (USER) R-B	(−99 to 99)	Sets the matrix coefficients.
MATRIX (USER) G-B	(−99 to 99)	Sets the matrix coefficients.

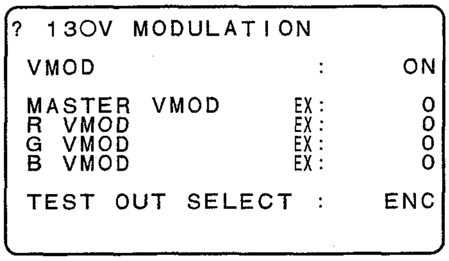
MTX MULTI Display (Setting multi matrix)

```
? 12○MTX MULTI

 MATRIX             :       ON
 MATRIX  (MULTI)    :      OFF

 MATRIX AREA IND. :        OFF
 MATRIX COLOR DET :       EXEC

 MTX (MULTI)  AXIS  :        B
 MTX (MULTI)  HUE   :        0
 MTX (MULTI)  SAT   :        0
```

← It is to be OFF only when J is selected in the item UC/J SELECT on the 19○FORMAT display in the NTSC mode.

Item	Setting	Function
MATRIX	OFF/ON	Turns ON/OFF the linear matrix and multi matrix functions.
MATRIX (MULTI)	OFF/ON	Turns ON/OFF the multi matrix function.
MATRIX AREA IND.	OFF/ON	Turns ON/OFF the function that shows the zebra pattern indicating the detecting region of the multi matrix correction, inside VF.
MATRIX COLOR DET	Press the rotary encoder to execute this menu item.	Automatic color detection function. Move the cursor to the desired object color and press the rotary encoder. Then the MTX (MULTI) AXIS will be set automatically.
MTX (MULTI) AXIS	B/B+/MG−/MG/MG+/ R/R+/YL−/YL+/ G−/G/G+/CY/CY+/B−	Selects the chroma phase to correct.
MTX (MULTI) HUE	(−99 to 99)	Adjusts the chroma phase (HUE) of the multi matrix correction.
MTX (MULTI) SAT	(−99 to 99)	Adjusts the saturation (SAT) of the multi matrix correction.

V MODULATION Display (Adjusting Temporary WHITE V SAW SHADING for LENS)



```
? 13OV MODULATION
 VMOD                 :     ON

 MASTER VMOD        EX:      0
 R VMOD             EX:      0
 G VMOD             EX:      0
 B VMOD             EX:      0

 TEST OUT SELECT      :    ENC
```

Item	Setting	Function
VMOD	OFF/ON	Turns ON/OFF the V. modulation function.
MASTER VMOD	(−99 to 99)	Adjusts amount of the master V. modulation correction. (All of the R, G and B V. modulation corrections are controlled.)
R VMOD	(−99 to 99)	Adjusts amount of the R V. modulation correction.
G VMOD	(−99 to 99)	Adjusts amount of the G V. modulation correction.
B VMOD	(−99 to 99)	Adjusts amount of the B V. modulation correction.
TEST OUT SELECT	ENC/R/G/B	Selects the video signal that is output from the TEST OUT terminal. The output signal returns to the ENC-signal without fail at power-on.

Note

In the MASTER VMOD and R/G/B VMOD, the lens extender position is displayed in the rightmost-end of the menu items.

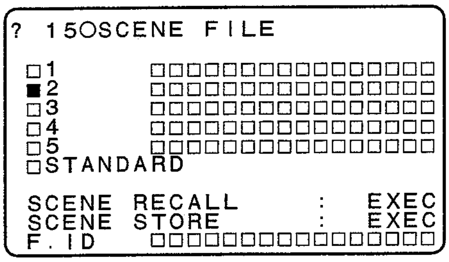
Blank : OFF
EX: ON
08 : 0.8

LOW KEY SAT. Display (Setting the low key saturation)

```
? 14OLOW KEY SAT.

 LOW KEY SAT.       :   OFF
 L.KEY SAT.LEVEL    :     0
 L.KEY SAT.RANGE    :  HIGH

 Y BLACK GAMMA      :   OFF
 Y BLK GAM LEVEL    :     0
 Y BLK GAM RANGE    :  HIGH
```

Item	Setting	Function
LOW KEY SAT.	OFF/ON	Turns ON/OFF the low key saturation function.
L.KEY SAT.LEVEL	(−99 to 99)	Sets the saturation level in the darker video signal.
L.KEY SAT.RANGE	LOW/L.MID/ H.MID/HIGH	Sets the range of video signal in which the low key saturation correction is effective. LOW : 0 to 3.6 % L.MID : 0 to 7.2 % H.MID : 0 to 14.4 HIGH : 0 to 28.8 %
Y BLACK GAMMA	OFF/ON	Turns ON/OFF the Y black gamma correction function.
Y BLK GAM LEVEL	(−99 to 99)	Adjust the Y black gamma correction curve.
Y BLK GAM RANGE	LOW/L.MID/ H.MID/HIGH	Sets the range of video signal in which the Y black gamma correction is effective. LOW : 0 to 3.6 % L.MID : 0 to 7.2 % H.MID : 0 to 14.4 HIGH : 0 to 28.8 %

SCENE FILE Display (Operating the SCENE file)



```
? 150SCENE FILE
□1       □□□□□□□□□□□□□□□□
■2       □□□□□□□□□□□□□□□□
□3       □□□□□□□□□□□□□□□□
□4       □□□□□□□□□□□□□□□□
□5       □□□□□□□□□□□□□□□□
□STANDARD
SCENE RECALL     :    EXEC
SCENE STORE      :    EXEC
F.ID     □□□□□□□□□□□□□□□□
```

Item	Setting	Function
1 to 5	□/■	RECALL/CANCEL function of the SCENE file. Selects whether to read the SCENE file from the inside of the main unit or not to read. □ : To read (CANCEL) ■ : No to read (RECALL)
STANDARD	□/■	Selects whether to return the SCENE file setup to the standard setting or not to return to. □ : To return ■ : Not to return (After the setting is returned to the standard setting, the display changes to □.)
SCENE RECALL	Press the rotary encoder to move to the file selection display.*1	Calls the SCENE file from the main unit. Or read the SCENE file from a memory stick.
SCENE STORE	Press the rotary encoder to move to the file selection display.*1	Save the SCENE file to the main unit or,memory stick.
F.ID	16 characters (alphanumeric characters, symbols and spaces)	Sets the file ID. (When the SCENE file is stored, the file ID is saved.)

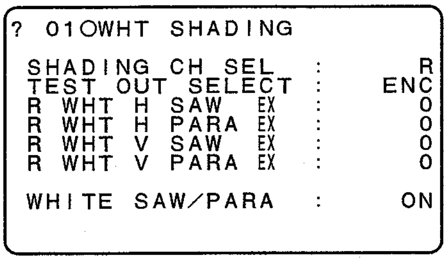
*1 : Refer to "4-7. FILE Menu" for the file selection display.

4-6. MAINTENANCE Menu

Note

When the range of setting is surrounded by parenthesis ( ) in the setting column, the setup value is the relative value. The range of setting in parenthesis ( ) can be different from what shown in the manual depending on the setting in the layer lower than this menu.

WHT SHADING Display (Adjusting white shading)



```
? 01OWHT SHADING

  SHADING CH SEL     :      R
  TEST OUT SELECT    :    ENC
  R WHT H SAW   EX   :      0
  R WHT H PARA  EX   :      0
  R WHT V SAW   EX   :      0
  R WHT V PARA  EX   :      0

  WHITE SAW/PARA     :     ON
```

Item	Setting	Function
SHADING CH SEL	R/G/B/TEST[*1]	Selects the channel of shading correction. When TEST is selected, the channel that you want to adjust, is interlocked with the setting of TEST OUT SELECT. (When ENC is selected by TEST OUT SELECT, the previous channel is set.)
TEST OUT SELECT	ENC/R/G/B	Selects the video signal that is output from the TEST OUT terminal. The output signal returns to the ECN-signal without fail at power-on.
R/G/B WHT H SAW	(−99 to 99)	Adjusts the H.SAW correction. The R, G and B displays are switched in accordance with the channel selection implemented by the above SHADING CH SEL.
R/G/B WHT H PARA	(−99 to 99)	Adjusts the H.PARA correction. The R, G and B displays are switched in accordance with the channel selection implemented by the above SHADING CH SEL.
R/G/B WHT V SAW	(−99 to 99)	Adjusts the V.SAW correction. The R, G and B displays are switched in accordance with the channel selection implemented by the above SHADING CH SEL.
R/G/B WHT V PARA	(−99 to 99)	Adjusts the V.PARA correction. The R, G and B displays are switched in accordance with the channel selection implemented by the above SHADING CH SEL.
WHITE SAW/PARA	OFF/ON	Turns ON/OFF all of the white shading menu items of R/G/B, H/V and SAW/PARA corrections.

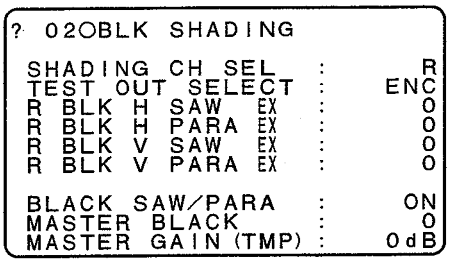
*1 : TEST is displayed only when the unit of which the ROM version of the AT board is 1.40 and higher. You can check the ROM version of the AT board by the ROM VERSION display in the DIAGNOSIS menu.

Note

In the R/G/B WHT H SAW/PARA and R/G/B WHT V SAW/PARA, the lens extender position is displayed in the rightmost-end of the menu items.

Blank : OFF
EX : ON
08 : 0.8

BLK SHADING Display (Adjusting black shading)



```
? 020BLK SHADING
 SHADING CH SEL      :     R
 TEST OUT SELECT     :   ENC
 R BLK H SAW    EX   :     0
 R BLK H PARA   EX   :     0
 R BLK V SAW    EX   :     0
 R BLK V PARA   EX   :     0

 BLACK SAW/PARA      :    ON
 MASTER BLACK        :     0
 MASTER GAIN (TMP)   :   0dB
```

Item	Setting	Function
SHADING CH SEL	R/G/B/TEST[1]	Selects the channel of black shading correction. When TEST is selected, the channel that you want to adjust, is interlocked with the setting of TEST OUT SELECT. (When ENC is selected by TEST OUT SELECT, the previous channel is set.)
TEST OUT SELECT	ENC/R/G/B	Selects the video signal that is output from the TEST OUT terminal. The output signal returns to the ENC-signal without fail at power-on.
R/G/B BLK H SAW	(−99 to 99)	Adjusts the H.SAW correction. The R, G and B displays are switched in accordance with the channel selection implemented by the above SHADING CH SEL.
R/G/B BLK H PARA	(−99 to 99)	Adjusts the H.PARA correction. The R, G and B displays are switched in accordance with the channel selection implemented by the above SHADING CH SEL.
R/G/B BLK V SAW	(−99 to 99)	Adjusts the V.SAW correction. The R, G and B displays are switched in accordance with the channel selection implemented by the above SHADING CH SEL.
R/G/B BLK V PARA	(−99 to 99)	Adjusts the V.PARA correction. The R, G and B displays are switched in accordance with the channel selection implemented by the above SHADING CH SEL.
BLACK SAW/PARA	OFF/ON	Turns OFF/ON all of the black shading menu items of R/G/B, H/V and SAW/PARA corrections.
MASTER BLACK	(−99 to 99)	Adjusts the master black level. (All of the R, G and B signal black levels are adjusted.)
MASTER GAIN (TMP)	−3/0/3/6/9/12/18/24/30/36/42/48	Sets the temporary master gain.

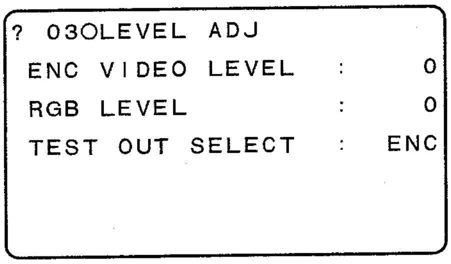
[1] : TEST is displayed only when the unit of which the ROM version of the AT board is 1.40 and higher. You can check the ROM version of the AT board by the ROM VERSION display in the DIAGNOSIS menu.

Note

In the R/G/B BLK H SAW/PARA and R/G/B BLK V SAW/PARA, the lens extender position is displayed in the rightmost-end of the menu items.

Blank : OFF
EX : ON
08 : 0.8

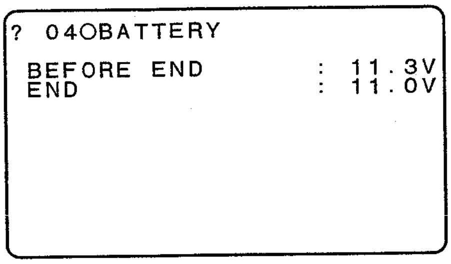
LEVEL ADJ Display (Adjusting output signal level)



```
? 030LEVEL ADJ
 ENC VIDEO LEVEL   :    0
 RGB LEVEL         :    0
 TEST OUT SELECT   :  ENC
```

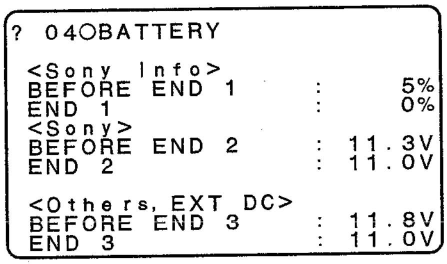
Item	Setting	Function
ENC VIDEO LEVEL	(–99 to 99)	Adjusts the composite video signal level.
RGB LEVEL	(–99 to 99)	Adjusts the RGB signal level (VF OUT/TEST OUT).
TEST OUT SELECT	ENC/R/G/B	Selects the video signal that is output from the TEST OUT terminal. The output signal returns to the ENC-signal without fail at power-on.

BATTERY Display (Setting the battery-related items)



```
? 040BATTERY
 BEFORE END        :  11.3V
 END               :  11.0V
```

The ROM version of the AT board is before 1.50



```
? 040BATTERY
 <Sony Info>
 BEFORE END 1      :     5%
 END 1             :     0%
 <Sony>
 BEFORE END 2      :  11.3V
 END 2             :  11.0V
 <Others, EXT DC>
 BEFORE END 3      :  11.8V
 END 3             :  11.0V
```

The ROM version of the AT board is 1.50 and higher

When the ROM version of the AT board is before 1.50*1

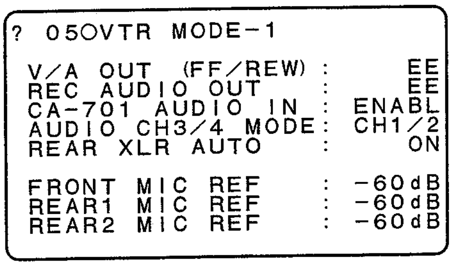
Item	Setting	Function
BEFORE END	11.0 to 13.0 V (0.1 V steps)	Sets the battery-before-end voltage and the battery-end voltage. (The set voltage applies to all batteries.)
END	10.5 to 11.5 V (0.1 V steps)	

When the ROM version of the AT board is 1.50 and higher*1

Item	Setting	Function
BEFORE END 1	5/10/15	When BP-M50/M100 is used, sets the battery-before-end capacity and the battery-end capacity.
END 1	0/1/2/3/4/5	
BEFORE END 2	11.0 to 13.0 V (0.1 V steps)	When BP-L40A/60A/90A, NP-1B or BP-90A is used, sets the battery-before-end voltage and the battery-end voltage.
END 2	10.5 to 11.5 V (0.1 V steps)	
BEFORE END 3	11.0 to 13.0 V (0.1 V steps)	When any battery other what are listed above or DC IN terminal is used, sets the battery-before-end voltage and the battery-end voltage.
END 3	10.5 to 11.5 V (0.1 V steps)	

*1 : The Display is differenet depending upon the ROM version of the AT board.You can check the ROM version of the AT board by the ROM VERSION display in the DIAGNOSIS menu.

VTR MODE-1 Display (Setting-1 on VTR)



```
? 05OVTR MODE-1
 V/A OUT  (FF/REW) :      EE
 REC AUDIO OUT     :      EE
 CA-701 AUDIO IN   :   ENABL
 AUDIO CH3/4 MODE  :   CH1/2
 REAR XLR AUTO     :      ON

 FRONT MIC REF     :  -60dB
 REAR1 MIC REF     :  -60dB
 REAR2 MIC REF     :  -60dB
```

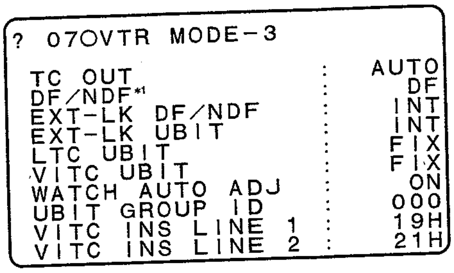
Item	Setting	Function
V/A OUT (FF/REW)	EE/PB	Selects the video output signal during FF/REW.
REC AUDIO OUT	EE/SAVE	Selects the audio output signal during recording. EE : EE output SAVE :No output (Energy-save mode)
CA-701 AUDIO IN	ENABL/DSABL	Selects whether the AUDIO IN CH3, CH4 of the camera adapter (CA-701) is enabled to use or not enabled when camera adapter is installed. ENABL : Camera adapter can be used. DSABL : Camera adapter cannot be used.
AUDIO CH3/4 MODE	CH1/2/SW	Selects the input signal to be recorded on CH3/4. CH1/2 : Same signals as CH1 and CH2. SW : The input signals that are selected by the AUDIO IN CH3, CH4 switches on the inside panel.
REAR XLR AUTO	OFF/ON	Turns ON/OFF the function to detect automatically whether connector is connected to the AUDIO IN connector on the rear panel.
FRONT MIC REF	−60 dB/−50 dB	Selects the reference input level of the front microphone.
REAR1 MIC REF	−60 dB/−50 dB	Selects the reference input level of the signal that is connected to AUDIO IN CH1.
REAR2 MIC REF	−60 dB/−50 dB	Selects the reference input level of the signal that is connected to AUDIO IN CH2.

VTR MODE-2 Display (Setting-2 on VTR)

```
? 060VTR MODE-2
 AU DATA LENGTH     :  16bit
 AU REC EMPHASIS    :    OFF
 AU REF LEVEL       :  -20dB
 AU REF OUT         :    0dB
 AU SG  (1KHz)      :    OFF
 MIC CH1 LEVEL      :  FRONT
 MIC CH2 LEVEL      :  FRONT
 REAR1/WRR LEVEL    :  SIDE1
 REAR2/WRR LEVEL    :  SIDE2
```

Item	Setting	Function
AU DATA LENGTH	16 bit/20 bit	Sets the bit length of the digital audio recording.
AU REC EMPHASIS	OFF/ON	Turns ON/OFF the audio emphasis during recording.
AU REF LEVEL	−18 dB/−20 dB	Sets the output level of the 1 kHz test tone.
AU REF OUT	0 dB/+4 dB/−3 dB	Sets the output level with respect to the REF. level.
AU SG (1 KHz)	ON/OFF/AUTO	Sets whether to output the 1 kHz test tone during the Color BAR mode or not. ON : 1 kHz test tone is output during the Color BAR mode. OFF : 1 kHz test tone is not output during the Color BAR mode. AUTO : 1 kHz test tone is output only when the CH1 AUDIO SELECT switch on the inside panel is in the AUTO position.
MIC CH1 LEVEL	SIDE1/FRONT/F+S1	When recording the front microphone sound on CH1, selects which control knob to be used for the level adjustment. SIDE1 : Adjusts it with the AUDIO LEVEL knob (left side) on the side panel. FRONT : Adjusts it with the MIC LEVEL knob on the front panel. F + S1 : It can be adjusted by either the AUDIO LEVEL knob (left side) or the MIC LEVEL knob. (Two knobs are interlocked each other.)
MIC CH2 LEVEL	SIDE2/FRONT/F+S2	When recording the front microphone sound on CH2, selects which control knob to be used for the level adjustment. SIDE2 : Adjusts it with the AUDIO LEVEL knob (right side) on the side panel. FRONT: Adjusts it with the MIC LEVEL knob on the front panel. F + S2 : It can be adjusted by either the AUDIO LEVEL knob (right side) or the MIC LEVEL knob. (Two knobs are interlocked each other.)
REAR1/WRR LEVEL	SIDE1/FRONT/F+S1	Selects any of these knobs to adjust the equipment that is connected to the wireless microphone and what is connected to the AUDIO IN CH1 connector on the rear panel. SIDE1 : Adjusts it with the AUDIO LEVEL knob (left side) on the side panel. FRONT : Adjusts it with the MIC LEVEL knob on the front panel. F + S1 : It can be adjusted by either the AUDIO LEVEL knob (left side) or the MIC LEVEL knob. (Two knobs are interlocked each other.)
REAR2/WRR LEVEL	SIDE2/FRONT/F+S2	Selects any of these knobs to adjust the equipment that is connected to the wireless microphone and what is connected to the AUDIO IN CH2 connector on the rear panel. SIDE2 : Adjusts it with the AUDIO LEVEL knob (right side) on the side panel. FRONT : Adjusts it with the MIC LEVEL knob on the front panel. F + S2 : It can be adjusted by either the AUDIO LEVEL knob (right side) or the MIC LEVEL knob. (Two knobs are interlocked each other.)

VTR MODE-3 Display (Setting-3 on VTR)



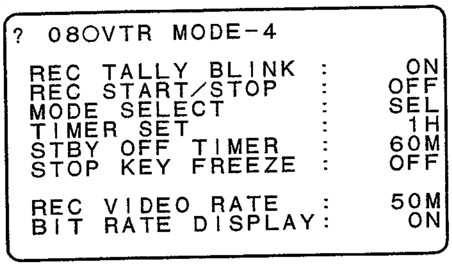
```
? 070VTR MODE-3
 TC OUT           :  AUTO
 DF/NDF*1         :    DF
 EXT-LK DF/NDF    :   INT
 EXT-LK UBIT      :   INT
 LTC UBIT         :   FIX
 VITC UBIT        :   FIX
 WATCH AUTO ADJ   :    ON
 UBIT GROUP ID    :   000
 VITC INS LINE 1  :   19H
 VITC INS LINE 2  :   21H
```

← 19H (for PAL), 16H (for NTSC)
← 21H (for PAL), 18H (for NTSC)

*1 : The DF/NDF menu and the EXT-LK DF/NDF menu are displayed only when the camcoder is set to be NTSC.

Item	Setting	Function
TC OUT	AUTO/GENE	Sets the time-code signal output. AUTO : Outputs the time-code generator during recording and outputs the time-code reader during playback. GENE : Outouts the time-code generator during recording and outputs the time-code generator during playback.
DF/NDF*1	DF/NDF	Sets DF/NDF. DF : Drop frame mode NDF : Non drop frame mode
EXT-LK DF/NDF*1	INT/EXT	Selects to follow either internal setting or external setting of DF/NDF. INT : Internal EXT : External
EXT-LK UBIT	INT/EXT	Sets whether the LTC UBIT setup value locks to INT or EXT source when the time-code is locked to an external source. INT : Internal lock EXT : External lock
LTC UBIT	FIX/TIME	Sets the data to be recorded in UBIT of LTC. FIX : Records the data that is set by user. TIME : Records the present time.
VITC UBIT	FIX/TIME	Sets the data to be recorded in UBIT of VITC. FIX : Records the data that is set by user. TIME : Records the present time.
WATCH AUTO ADJ	OFF/ON	Turns ON/OFF the function to match the built-in watch with the actual time data contained in the UBIT of external time code data.
UBIT GROUP ID	000/101	Selects the UBIT GROUP ID.
VITC INS LINE 1	PAL : 9H/10H/11H/12H/13H/14H/15H/16H/17H/18H/19H/20H/21H/22H NTSC : 12H/13H/14H/15H/16H/17H/18H/19H/	Specifies the VITC insertion line in the record mode.
VITC INS LINE 2	PAL : 9H/10H/11H/12H/13H/14H/15H/16H/17H/18H/19H/20H/21H/22H NTSC : 12H/13H/14H/15H/16H/17H/18H/19H/	Specifies the VITC insertion line in the record mode.

VTR MODE-4 Display (Setting-4 on VTR)



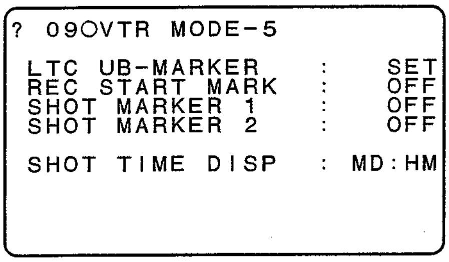
```
? 08OVTR MODE-4
 REC TALLY BLINK  :    ON
 REC START/STOP   :   OFF
 MODE SELECT      :   SEL
 TIMER SET        :    1H
 STBY OFF TIMER   :   60M
 STOP KEY FREEZE  :   OFF

 REC VIDEO RATE   :   50M
 BIT RATE DISPLAY :    ON
```

Item	Setting	Function
REC TALLY BLINK	OFF/ON	Turns ON/OFF the tally illumination control at the event of BATTERY BEFORE END/TAPE BEFORE END.
REC START/STOP	OFF/ON	Turns ON/OFF the alarm sound at REC START/STOP.
MODE SELECT	SEL/OFF/CONT	Sets the TC display after the power-off as follows. SEL : The TC display turns off after elapse of the time set by the TIMER SET below. OFF : No displayed CONT : Displayed
TIMER SET	1H/3H/8H	Sets the time to disappear the TC display after power-off when the above MODE SELECT is set to SEL. (H : hours)
STBY OFF TIMER*1	OFF/5MIN/10MIN/ 30MIN/60MIN	When the SAVE/STBY switch is set in STBY, Sets the time when the STBY state is automatically released.
STOP KEY FREEZE*1	OFF/FRAME/FIELD	Sets to freeze or not to freeze the playback picture by pressing the STOP button during playback. Pressing the STOP button again enters the STOP state.
REC VIDEO RATE*2	30M/40M/50M	Sets the video record bit rate.
BIT RATE DISPLAY*2	OFF/ON	Turns ON/OFF the function to display the set video record bit rate on the operation/warning message display area on the viewfinder screen when the above REC VIDEO RATE is set to any value other than 50 Mbps. **Note** The video record bit rate will not be displayed when the Interval REC display or warning message is being displayed on screen even if this item is set to ON.

*1 : This item is displayed only when the unit of which the ROM version of the AT board is 1.40 and higher. You can check the ROM version of the AT board by the ROM VERSION display in the DIAGNOSIS menu.

*2 : This item is displayed only when the unit of which the ROM version of the AT board is 1.50 and higher. You can check the ROM version of the AT board by the ROM VERSION display in the DIAGNOSIS menu.

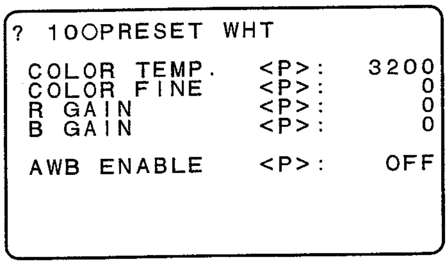
VTR MODE-5 Display (Setting-5 on VTR)



```
? 09OVTR MODE-5

 LTC UB-MARKER      :     SET
 REC START MARK     :     OFF
 SHOT MARKER 1      :     OFF
 SHOT MARKER 2      :     OFF

 SHOT TIME DISP     :   MD:HM
```

Item	Setting	Function
LTC UB-MARKER	SET/ALL/OFF	Sets whether to write down the marker in UBIT of LTC, or not. SET : Write the marker only of the items that are set to ON among the REC START MARK or SHOT MARKER1or SHOT MARKER2 respectively describes shown below. ALL : All markers are written. OFF : All markers are not written. **Note** When ALL or OFF is selected, the setting of among the REC START MARK or SHOT MARKER1 or SHOT MARKER2 becomes invalid.
REC START MARK	OFF/ON	Turns ON/OFF the function to write the REC START MARK.
SHOT MARKER 1	OFF/ON	Turns ON/OFF the function to write the SHOT MARKER 1.
SHOT MARKER 2	OFF/ON	Turns ON/OFF the function to write the SHOT MARKER 2.
SHOT TIME DISP	MD : HM/DM : HM/D : HMS	Sets the format of the time to be displayed on LCD. MD : HM : Month, day, hour, minute DM : HM : Day, month, hour, minute D : HMS : Day, hour, minute, second

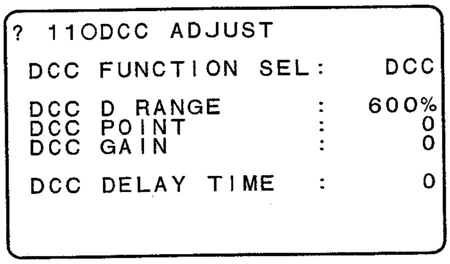
PRESET WHT Display (WHITE BAL switch: The function to adjust the white balance gain that is assigned to PRST)



```
? 100PRESET WHT

 COLOR TEMP.   <P>:   3200
 COLOR FINE    <P>:      0
 R GAIN        <P>:      0
 B GAIN        <P>:      0

 AWB ENABLE    <P>:    OFF
```

Item	Setting	Function
COLOR TEMP.<P>	Display the color temperature (Guideline)	Sets the value that is close to the color temperature of your reference using the displayed value as the guideline. Reference : The R GAIN and B GAIN values also change accordingly at the same time.
COLOR FINE <P>	(−99 to 99)	Uses this item for fine adjustment when the optimum color cannot be obtained by the above COLOR TEMP. Reference : The R GAIN and B GAIN values also change accordingly at the same time.
R GAIN <P>	(−99 to 99)	Uses this menu item to set the color temperature during WHITE PRESET, by adjusting R GAIN.
B GAIN <P>	(−99 to 99)	Uses this menu item to set the color temperature during WHITE PRESET, by adjusting B GAIN.
AWB ENABLE <P>	OFF/ON	Turns ON/OFF the function that sets the white balance adjustment value as the preset value when the white balance automatic adjustment is executed with the WHITE BAL switch being set in PRST.

DCC ADJUST Display (Setting the DCC function)



```
? 110DCC ADJUST
 DCC FUNCTION SEL:    DCC

 DCC D RANGE     :   600%
 DCC POINT       :      0
 DCC GAIN        :      0

 DCC DELAY TIME  :      0
```

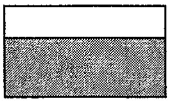
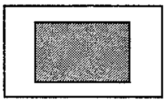
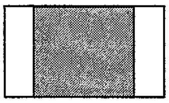
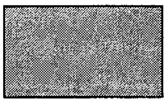
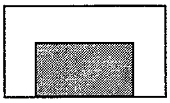
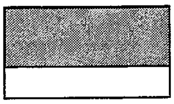
Item	Setting	Function
DCC FUNCTION SEL	DCC/ADP.K/FIX	Selects the DCC function modes when the DCC switch is ON. DCC : Normal mode ADP.K : Amount of the knee correction is changed automatically to the optimum level after the shooting object that occupies most of the adaptive type mode screen, is detected. FIX : The knee correction is performed with the range fixed to 600%.
DCC D RANGE	400/450/500/550/600 (%)	Sets the dynamic range when the DCC switch is set to ON.
DCC POINT	(−99 to 99)	Sets the minimum knee point when the DCC switch is set to ON.
DCC GAIN	(−99 to 99)	Sets the knee slope when the DCC switch is set to ON.
DCC DELAY TIME	(−99 to 99)	Sets the response speed of DCC. (Increasing the data slows down the response speed.)

AUTO IRIS 2 Display (Setting AUTO IRIS)

```
? 120AUTO IRIS 2
  IRIS WINDOW      :     1
  IRIS WINDOW IND. :   OFF
  IRIS LEVEL       :     0
  IRIS APL RATIO   :     0
  IRIS VAR WIDTH   :   245
  IRIS VAR HEIGHT  :    72
  IRIS VAR H POS.  :     0
  IRIS VAR V POS.  :     0
  IRIS SPEED       :     2
  CLIP HIGH LIGHT  :   OFF
```

Item	Setting	Function
IRIS WINDOW	1/2/3/4/5/6/VAR	Selects the IRIS WINDOW (detection range). *1 When VAR is selected, the iris window can be set by the IRIS VAR WIDTH/HEIGHT/H POS/V POS as described below.
IRIS WINDOW IND.	OFF/ON	Turns ON/OFF the function that checks the iris window with the box cursor.
IRIS LEVEL	(−99 to 99)	Sets the auto iris convergence level.
IRIS APL RATIO	(−99 to 99)	When the APL ratio is increased, the detection level becomes closer to the average picture level. When it is decreased, the detection level becomes closer to the peak picture level.
IRIS VAR WIDTH	20 to 465	Sets width of the iris window when VAR is selected in the above IRIS WINDOW.
IRIS VAR HEIGHT	20 to 120 (NTSC) 20 to 142 (PAL)	Sets height of the iris window when VAR is selected in the above IRIS WINDOW.
IRIS VAR H POS.	−452 to 452 (NTSC) *2 −447 to 448 (PAL) *2	Sets the center in the vertical direction of the iris window when VAR is selected in the above IRIS WINDOW.
IRIS VAR V POS.	−101 to 100 (NTSC) *2 −123 to 123 (PAL) *2	Sets the center in the horizontal direction of the iris window when VAR is selected in the above IRIS WINDOW.
IRIS SPEED	0/1/2/3/4/5	Sets the AUTO IRIS response speed. 0 (Fast) ↔ 5 (Slow)
CLIP HIGH LIGHT	OFF/ON	Turns ON/OFF the function that limits the AUTO IRIS detection level to 100% when the video signal of higher than 100% is input.

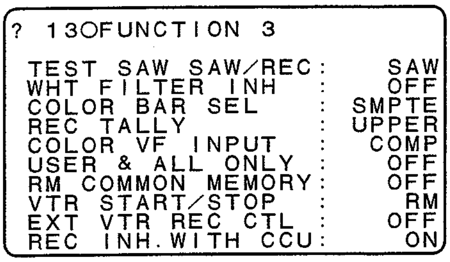
*1 : The IRIS WINDOW is set as shown below.

Setting	1	2	3	4	5	6
VF screen						

Shaded (▨) area : IRIS WINDOW frame

*2 : Range of this setting is different depending upon the above IRIS VAR WIDTH/HEIGHT setting.

FUNCTIN 3 Display (Setting various functions)



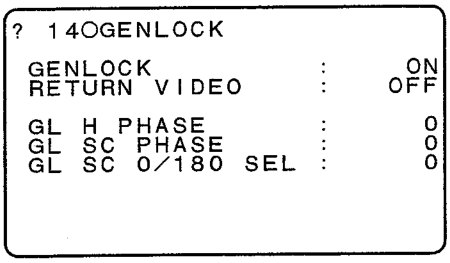
```
? 13OFUNCTION 3
 TEST SAW SAW/REC:     SAW
 WHT FILTER INH   :    OFF
 COLOR BAR SEL    :  SMPTE
 REC TALLY        :  UPPER
 COLOR VF INPUT   :   COMP
 USER & ALL ONLY  :    OFF
 RM COMMON MEMORY:     OFF
 VTR START/STOP   :     RM
 EXT VTR REC CTL  :    OFF
 REC INH.WITH CCU:      ON
```

Item	Setting	Function
TEST SAW SAW/REC	SAW/REC	Selects the waveform (SAW/RECTANGLE) when the item TEST SAW is ON.
WHT FILTER INH	OFF/ON	Turns ON/OFF the function that maintains the white balance value without regard to the CC filter (or single filter) position.
COLOR BAR SEL	SMPTE/EBU/SNG	Selects the internal color-bars signal. SMPTE : NTSC EBU : PAL
REC TALLY	UPPER/BOTH	Selects the LEDs inside VF that turn on during recording. UPPER: Only the LED in the upper center. BOTH: Both of the LEDs in the upper center and lower center.
COLOR VF INPUT	COMP/VBS/BOTH	Sets the signal input to the color VF.
USER & ALL ONLY*1	OFF/ON	Turns ON/OFF the function that prohibits to display the categories from OPERATION to DIAGNOSIS on the TOP menu.
RM COMMON MEMORY	OFF/ON	Sets the setup values that are connected in the event of connecting a remote control unit (such as RM-B150, MSU). OFF : An independent value that is effective only when the remote control is connected, is set. (When the remote control is disconnected, the value returns to the original setup before connecting the remote control.) ON : The setup value that is common to both connections when a remote control is connected and when a remote control is not connected. (When the remote control is disconnected, the adjusted setup value remains unchanged.) (For more details, refer to "5-10. Connecting the Remote Control Unit" of Operation Manual.)
VTR START/STOP*1	RM/CAM/PARA	Sets the VTR START/STOP operation when a remote control unit is connected. RM: The operation is permitted to the remote control unit only. CAM: The operation is permitted to the camera only. PARA: The operation is permitted both to the remote control unit and the camera.
EXT VTR REC CTL	OFF/ON	Recording with an external VTR synchronized with the Camcorder or not synchronized.
REC INH. WITH CCU	OFF/ON	Switching ON/OFF the REC prohibit function when CCU is connected. ON : Record is prohibited when CCU is connected. OFF : Record is not prohibited when CCU is connected. (In the OFF position, the color VF and the 5-inch VF cannot be used.)

---

*1 : This item is displayed only when the unit of which the ROM version of the AT board is 1.40 and higher. You can check the ROM version of the AT board by the ROM VERSION display in the DIAGNOSIS menu.

GENLOCK Display (Setting on GENLOLCK input terminal)



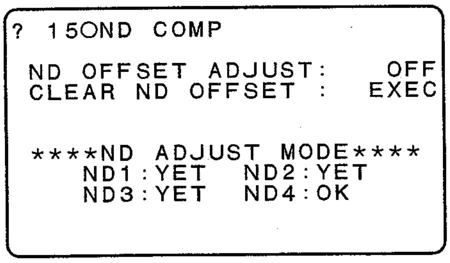
```
? 14OGENLOCK
 GENLOCK              :    ON
 RETURN VIDEO         :   OFF

 GL H PHASE           :     0
 GL SC PHASE          :     0
 GL SC 0/180 SEL      :     0
```

Item	Setting	Function
GENLOCK	OFF/ON	Turns ON/OFF the function that synchronizes the internal reference signal with the video signal that is connected to the GENLOCK terminal.
RETURN VIDEO	OFF/ON	Turns ON/OFF the function to display the camera return signal on VF when the RET button on the lens is pressed.
GL H PHASE	(–99 to 99)	GENLOCK H phase adjustment
GL SC PHASE	(–99 to 99)	GENLOCK SC phase adjustment
GL SC 0/180 SEL	0/180	GENLOCK SC phase adjustment (0 degree/180 degree)

ND COMP Display (ND OFFSET compensation)

Note

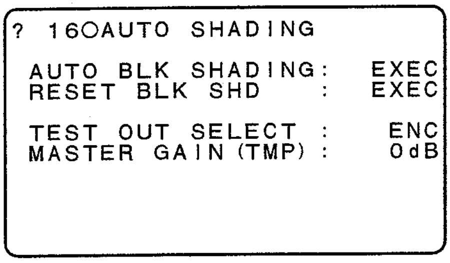
When only a single filter is used, this menu is not displayed.



```
? 15OND COMP
 ND OFFSET ADJUST:      OFF
 CLEAR ND OFFSET :     EXEC

 ****ND ADJUST MODE****
     ND1:YET    ND2:YET
     ND3:YET    ND4:OK
```

Item	Setting	Function
ND OFFSET ADJUST	OFF/ON	Turns ON/OFF the ND OFFSET adjustment mode.
CLEAR ND OFFSET	Press the rotary encoder to execute this menu item.	Returns the ND OFFSET value to the default value when manufactured in the production plant.
ND ADJUST MODE ND1 to 4	– Display only	ND OFFSET message display area OK : The filter on which the white balance automatic adjustment is already completed. YET : The filter on which the white balance automatic adjustment is not completed yet. (When the main power is turned off or then the above CLEAR ND OFFSET is performed, all displays change to YET.) This item is displayed when above ND OFFSET ADJUST is set to ON.

AUTO SHADING Display*1 (Auto adjustment of the shading)



```
? 16○AUTO SHADING

 AUTO BLK SHADING:    EXEC
 RESET BLK SHD   :    EXEC

 TEST OUT SELECT :     ENC
 MASTER GAIN (TMP) :   0dB
```

Item	Setting	Function
AUTO BLK SHADING	Press the rotary encoder to execute this menu item.	Starts to adjust the black shading automatically.
RESET BLK SHD	Press the rotary encoder to execute this menu item.	Returns the black shading value to the default value when manufactured in the production plant.
TEST OUT SELECT	ENC/R/G/B	Selects the video signal that is output from the TEST OUT terminal. The output signal returns to the ENC-signal without fail at power-on.
MASTER GAIN (TMP)	–3/0/3/6/9/12/18/24/30/36/42/48	Sets the temporary master gain.

*1 : This item is displayed only when the unit of which the ROM version of the AT board is 1.40 and higher. You can check the ROM version of the AT board by the ROM VERSION display in the DIAGNOSIS menu.

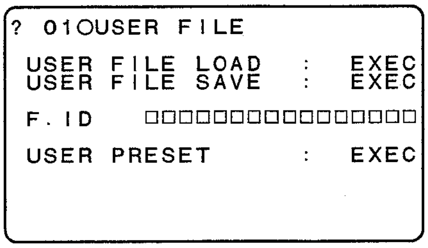
4-7. FILE Menu

For details of the file structure and the method to save the files, refer to “Section 5. File System.”

Note

When the range of setting is surrounded by parenthesis ( ) in the setting column, the setup value is the relative value. The range of setting in parenthesis ( ) can be different from what shown in the manual depending on the setting in the layer lower than this menu.

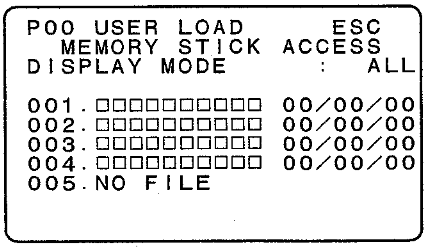
USER FILE Display (Operating the USER files)



```
? 010USER FILE
 USER FILE LOAD   :   EXEC
 USER FILE SAVE   :   EXEC
 F.ID    □□□□□□□□□□□□□□□□
 USER PRESET      :   EXEC
```

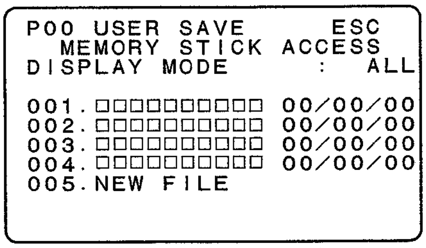
Item	Setting	Function
USER FILE LOAD	Press the rotary encoder to move to the file selection display.	Reads the USER file from a memory stick. (For the description of the file selection display, refer to the following descriptions.)
USER FILE SAVE	Press the rotary encoder to move to the file selection display.	Saves the USER file to a memory stick. (For the description of the file selection display, refer to the following descriptions.)
F.ID	16 characters (alphanumeric characters, symbols and spaces)	Sets the file ID.(When the USER FILE SAVE is executed, this ID is saved.)
USER PRESET	Press the rotary encoder to execute this menu item.	Returns all the items of the USER menu to the standard setup.

File selection display



```
P00 USER LOAD      ESC
   MEMORY STICK ACCESS
DISPLAY MODE     :  ALL
001.□□□□□□□□□□ 00/00/00
002.□□□□□□□□□□ 00/00/00
003.□□□□□□□□□□ 00/00/00
004.□□□□□□□□□□ 00/00/00
005.NO FILE
```

USER FILE LOAD

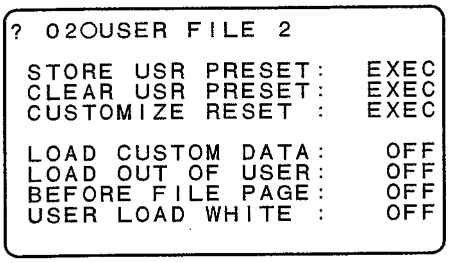


```
P00 USER SAVE      ESC
   MEMORY STICK ACCESS
DISPLAY MODE     :  ALL
001.□□□□□□□□□□ 00/00/00
002.□□□□□□□□□□ 00/00/00
003.□□□□□□□□□□ 00/00/00
004.□□□□□□□□□□ 00/00/00
005.NEW FILE
```

USER FILE SAVE

Item	Setting	Function
MEMORY STICK ACCESS	Display only	The display appears when inserting a memory stick or during saving data in a memory stick or during reading data from a memory stick.
DISPLAY MODE	ALL/F.ID/DATA/MODEL	Switches the attributes when displaying the following file. ALL : File ID and date are displayed. (□□□□□□□□□□ 00/00/00) F. ID : File ID is displayed. (□□□□□□□□□□□□□□□□) DATA : Date and time of saving the file are displayed. (00/00/00 00 : 00 : 00) MODEL: Model name is displayed.
001 to 005 : 096 to 100	Press the rotary encoder to execute this menu item.	When the file does not exist, the message NO FILE is displayed. Select the target read file from which data is read or select the target storage file to which the data is going to be stored. When saving the data in a new file, select NEW FILE.

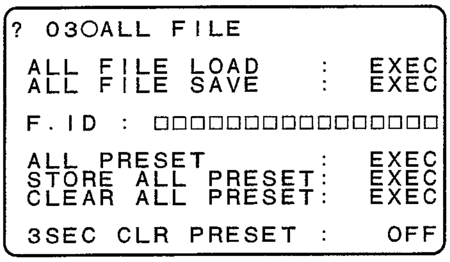
USER FILE 2 Display (Operating the USER file)



```
? 02OUSER FILE 2

 STORE USR PRESET:     EXEC
 CLEAR USR PRESET:     EXEC
 CUSTOMIZE RESET :     EXEC

 LOAD CUSTOM DATA:      OFF
 LOAD OUT OF USER:      OFF
 BEFORE FILE PAGE:      OFF
 USER LOAD WHITE :      OFF
```

Item	Setting	Function
STORE USR PRESET	Press the rotary encoder to execute this menu item.	Saves the data that is set by the USER menu, in the PRESET layer and uses it as the standard setup.
CLEAR USR PRESET	Press the rotary encoder to execute this menu item.	Returns the USER menu setup to the default setting when shipped from the factory.
CUSTOMIZE RESET	Press the rotary encoder to execute this menu item.	Returns the items that are edited by the MENU CUSTOMIZE menu, to the original setting.
LOAD CUSTOM DATA	OFF/ON	Turns ON/OFF the function to read out the data from memory stick that are set on the MENU CUSTOMIZE menu during execution of USER FILE LOAD.
LOAD OUT OF USER	OFF/ON	Turns ON/OFF the function to read out the data from memory stick that are not contained in the present USER menu during execution of USER FILE LOAD.
BEFORE FILE PAGE	OFF/ON	Turns ON/OFF the function not to save the USER FILE page and the subsequent pages of the USER menu, in memory stick during execution of USER FILE SAVE. ON: Not to save.
USER LOAD WHITE	OFF/ON	Turns ON/OFF the function to read out the white balance data from memory stick that are saved in USER FILE during execution of USER FILE LOAD.

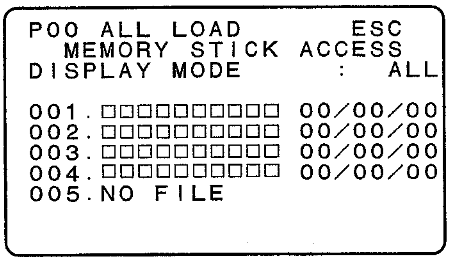
ALL FILE Display (Operating the ALL file)



```
? 03OALL FILE
 ALL FILE LOAD    :  EXEC
 ALL FILE SAVE    :  EXEC
 F.ID : □□□□□□□□□□□□□□□□
 ALL PRESET       :  EXEC
 STORE ALL PRESET:   EXEC
 CLEAR ALL PRESET:   EXEC
 3SEC CLR PRESET  :   OFF
```

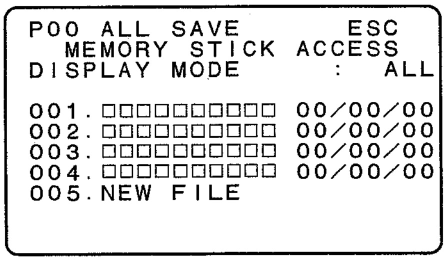
Item	Setting	Function
ALL FILE LOAD	Press the rotary encoder to move to the file selection display.	Reads the ALL file from a memory stick. (For the description of the file selection display, see below.)
ALL FILE SAVE	Press the rotary encoder to move to the file selection display.	Saves the ALL file in a memory stick. (For the description of the file selection display, see below.)
F.ID	16 characters (alphanumeric numbers, symbols and space)	Sets the file ID. (When ALL FILE SAVE is execute, this name is saved.)
ALL PRESET	Press the rotary encoder to execute this menu item.	Returns all the data of all menu items to the standard settings.
STORE ALL PRESET	Press the rotary encoder to execute this menu item.	Saves all the data that are set by all of the menu items, in the PRESET layer and uses them as the standard setups.
CLEAR ALL PRESET	Press the rotary encoder to execute this menu item.	Returns the settings of all menu items to the default setting when shipped from the factory.
3SEC CLR PRESET	OFF/ON	Turns ON/OFF the function that returns the data in the PRESET layer to its factory-set value when the MENU CANCEL/PRST/ESCAPE switch is pressed for 3 seconds. (It returns to OFF at power-on even when having been turned ON.)

File selection display



```
P00 ALL LOAD        ESC
  MEMORY STICK ACCESS
DISPLAY MODE      :  ALL
001.□□□□□□□□□□ 00/00/00
002.□□□□□□□□□□ 00/00/00
003.□□□□□□□□□□ 00/00/00
004.□□□□□□□□□□ 00/00/00
005.NO FILE
```

ALL FILE LOAD

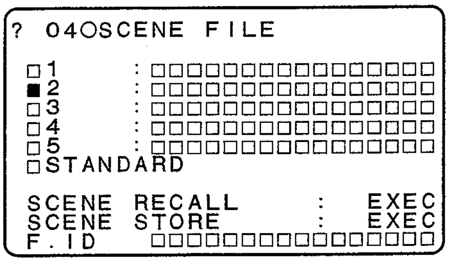


```
P00 ALL SAVE        ESC
  MEMORY STICK ACCESS
DISPLAY MODE      :  ALL
001.□□□□□□□□□□ 00/00/00
002.□□□□□□□□□□ 00/00/00
003.□□□□□□□□□□ 00/00/00
004.□□□□□□□□□□ 00/00/00
005.NEW FILE
```

ALL FILE SAVE

Descriptions of the respective file selection displays are the same as the file selection display of the USER FILE display.
For details, refer to the corresponding item of the USER FILE display.

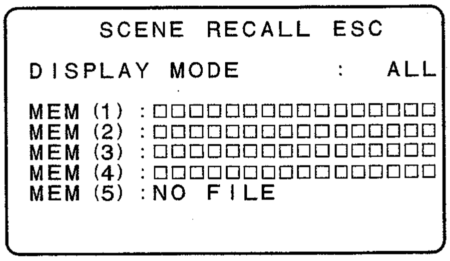
SCENE FILE Display (Operating the SCENE file)



```
? 040SCENE  FILE
 □1      :□□□□□□□□□□□□□□□□
 ■2      :□□□□□□□□□□□□□□□□
 □3      :□□□□□□□□□□□□□□□□
 □4      :□□□□□□□□□□□□□□□□
 □5      :□□□□□□□□□□□□□□□□
 □STANDARD
 SCENE  RECALL     :   EXEC
 SCENE  STORE      :   EXEC
 F.ID     □□□□□□□□□□□□□□□□
```

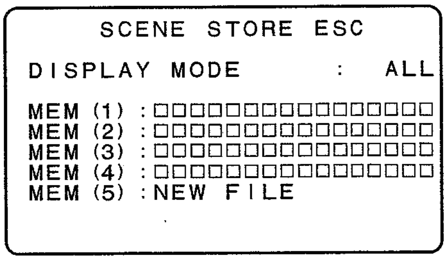
Item	Setting	Function
1 to 5	□/■	RECALL/CANCEL function of the SCENE file. Selects whether to read the SCENE file from the inside of the main unit or not to read. □ : To read (CANCEL) ■ : No to read (RECALL)
STANDARD	□/■	Selects whether to return the SCENE file setup to the standard setting or not to return to. □ : To return ■ : Not to return (After the setting is returned to the standard setting, the display changes to □.)
SCENE RECALL	Press the rotary encoder to move to the file selection display.	Calls the SCENE file from the main unit, or read the SCENE file from a memory stick. (For the description of the file selection display, see below.)
SCENE STORE	Press the rotary encoder to move to the file selection display.	Save the SCENE file to the main unit or memory stick. (For the description of the file selection display, see below.)
F.ID	16 characters (alphanumeric characters, symbols and space)	Sets the file ID. (When the SCENE file is stored, the file ID is saved.)

File selection display (When calling a file from the inside of the unit/when saving a file to the inside of the unit)



```
      SCENE  RECALL  ESC
 DISPLAY  MODE       :   ALL
 MEM (1) :□□□□□□□□□□□□□□□□
 MEM (2) :□□□□□□□□□□□□□□□□
 MEM (3) :□□□□□□□□□□□□□□□□
 MEM (4) :□□□□□□□□□□□□□□□□
 MEM (5) :NO  FILE
```

SCENE RECALL

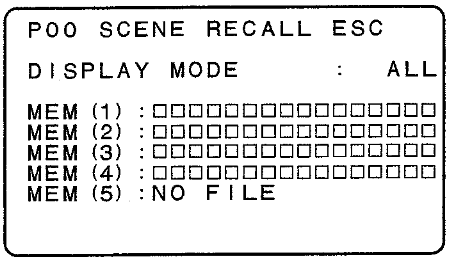


```
      SCENE  STORE  ESC
 DISPLAY  MODE       :   ALL
 MEM (1) :□□□□□□□□□□□□□□□□
 MEM (2) :□□□□□□□□□□□□□□□□
 MEM (3) :□□□□□□□□□□□□□□□□
 MEM (4) :□□□□□□□□□□□□□□□□
 MEM (5) :NEW  FILE
```

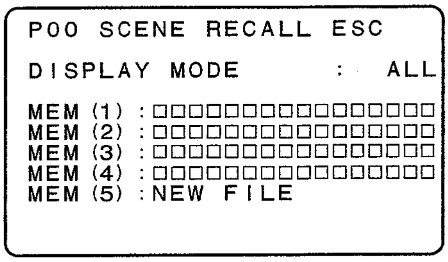
SCENE STORE

Item	Setting	Function
DISPLAY MODE	ALL/F.ID/DATE/MODEL	Switches the attributes when displaying a file stored in a memory stick. In the case of the file inside the main unit, the file ID is displayed regardless of the setting of ALL/F.ID/DATE/MODEL.
MEM (1) to (5)	Press the rotary encoder to execute this menu item.	Select the target read file from which data is read or select the target storage file to which the data is going to be stored. When the file does not exist, the message NO FILE is displayed. When saving the data in a new file, select NEW FILE.

File selection display (When reading a file from a memory stick/when saving a file to a memory stick)



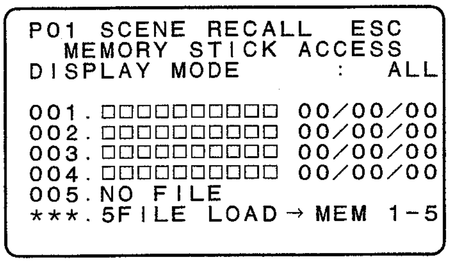
```
P00 SCENE RECALL ESC

DISPLAY MODE       :   ALL

MEM (1) :□□□□□□□□□□□□□□□□
MEM (2) :□□□□□□□□□□□□□□□□
MEM (3) :□□□□□□□□□□□□□□□□
MEM (4) :□□□□□□□□□□□□□□□□
MEM (5) :NO FILE
```



```
P00 SCENE RECALL ESC

DISPLAY MODE       :   ALL

MEM (1) :□□□□□□□□□□□□□□□□
MEM (2) :□□□□□□□□□□□□□□□□
MEM (3) :□□□□□□□□□□□□□□□□
MEM (4) :□□□□□□□□□□□□□□□□
MEM (5) :NEW FILE
```

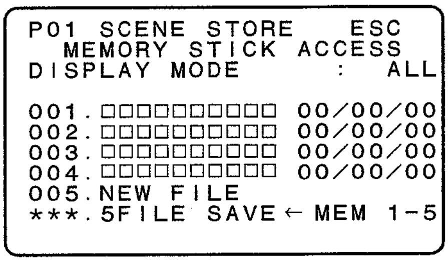
↓ page moves to

↓ page moves to



```
P01 SCENE RECALL  ESC
  MEMORY STICK ACCESS
DISPLAY MODE      :  ALL

001.□□□□□□□□□□ 00/00/00
002.□□□□□□□□□□ 00/00/00
003.□□□□□□□□□□ 00/00/00
004.□□□□□□□□□□ 00/00/00
005.NO FILE
***.5FILE LOAD→ MEM 1-5
```

SCENE RECALL

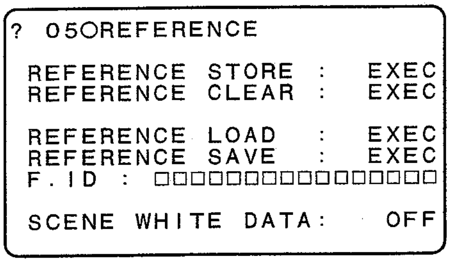


```
P01 SCENE STORE    ESC
  MEMORY STICK ACCESS
DISPLAY MODE      :  ALL

001.□□□□□□□□□□ 00/00/00
002.□□□□□□□□□□ 00/00/00
003.□□□□□□□□□□ 00/00/00
004.□□□□□□□□□□ 00/00/00
005.NEW FILE
***.5FILE SAVE← MEM 1-5
```

SCENE STORE

Item	Setting	Function
MEMORY STICK ACCESS	Display only	The display appears when inserting a memory stick or during saving data in a memory stick or during reading data from a memory stick.
DISPLAY MODE	ALL/F.ID/DATE/MODEL	Switches the attributes when displaying the following file. ALL : File ID and date are displayed. (□□□□□□□□□□ 00/00/00) F. ID : File ID is displayed. (□□□□□□□□□□□□□□□□) DATE : Date and time of saving the file are displayed. (00/00/00 00 : 00 : 00) MODEL : Model name is displayed.
001 to 005	Press the rotary encoder to execute this menu item.	When the file does not exist, the message NO FILE is displayed. Select the target read file from which data is read or select the target storage file to which the data is going to be stored. When saving the data in a new file, select NEW FILE.
5FILE LOAD	Press the rotary encoder to execute this menu item.	Reads the 5 files that are being displayed on screen, into MEM1-5 inside the main unit.
5FILE SAVE	Press the rotary encoder to execute this menu item.	Saves the contents of MEM1-5 of the main unit that are being displayed on screen, into 5 files.

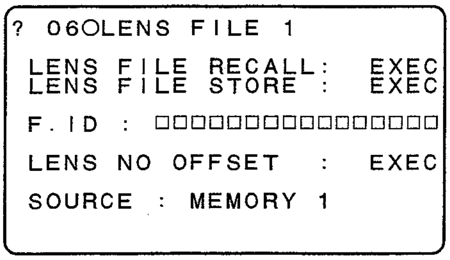
REFERENCE Display (Operating the REFERENCE file)



```
? 05OREFERENCE

 REFERENCE STORE :   EXEC
 REFERENCE CLEAR :   EXEC

 REFERENCE LOAD  :   EXEC
 REFERENCE SAVE  :   EXEC
 F.ID : □□□□□□□□□□□□□□□□

 SCENE WHITE DATA:    OFF
```

Item	Setting	Function
REFERENCE STORE	Press the rotary encoder and select YES for the confirmation message to execute this menu item.	Saves the REFERENCE file in the main unit.
REFERENCE CLEAR	Press the rotary encoder and select YES for the confirmation message to execute this menu item.	Returns the setting of the REFERENCE file to the standard setting.
REFERENCE LOAD	Press the rotary encoder and select YES for the confirmation message to execute this menu item.	Reads the REFERENCE file from a memory stick.
REFERENCE SAVE	Press the rotary encoder and select YES for the confirmation message to execute this menu item.	Saves the REFERENCE file in a memory stick.
F.ID	16 characters (alphanumeric numbers, symbols and space)	Sets the file ID. (When REFERENCE STORE of REFERENCE SAVE is executed, this ID is saved.)
SCENE WHITE DATA	OFF/ON	Turns ON/OFF the function to read out the white balance data from memory stick that are saved in SCENE file during execution of SCENE RECALL.

LENS FILE 1 Display (Operating the LENS file)



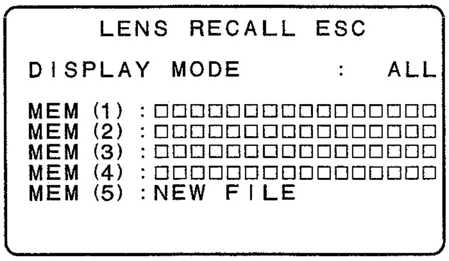
```
? 06OLENS FILE 1
 LENS FILE RECALL:   EXEC
 LENS FILE STORE :   EXEC
 F.ID : □□□□□□□□□□□□□□□□
 LENS NO OFFSET   :  EXEC
 SOURCE : MEMORY 1
```

Item	Setting	Function
LENS FILE RECALL	Press the rotary encoder to move to the file selection display.	Calls the LENS file from the main unit, or read the LENS file from a memory stick. (For the description of the file selection display, see below.)
LENS FILE STORE	Press the rotary encoder to move to the file selection display.	Save the LENS file to the main unit or memory stick. (For the description of the file selection display, see below.)
F.ID	16 characters (alphanumeric characters, symbols and spaces)	Sets the file ID. (When the LENS FILE STORE is executed, the file ID is saved.) (For the description of the file selection display, see below.)
LENS NO OFFSET	Press the rotary encoder to execute this menu item.	Returns the LENS file setting to the standard setting.
SOURCE	Display only	Displays the memory number or the filename of the LENS file from which the data is read.

Note

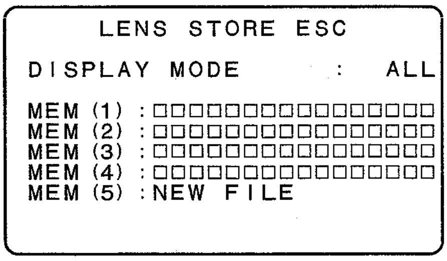
When the LENS FILE STORE is executed, the stored memory number is displayed. When the LENS NO OFFSET is executed, the message NO OFFSET is displayed.

File selection display (When calling a file from the inside of the unit/when saving a file to the inside of the unit)



```
      LENS RECALL ESC
 DISPLAY MODE       :  ALL
 MEM (1) :□□□□□□□□□□□□□□□□
 MEM (2) :□□□□□□□□□□□□□□□□
 MEM (3) :□□□□□□□□□□□□□□□□
 MEM (4) :□□□□□□□□□□□□□□□□
 MEM (5) :NEW FILE
```

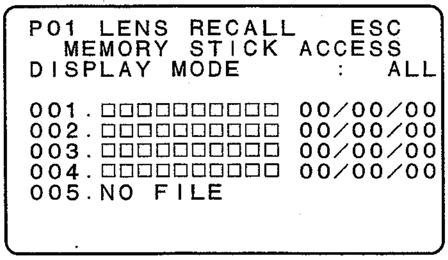
LENS FILE RECALL



```
      LENS STORE ESC
 DISPLAY MODE       :  ALL
 MEM (1) :□□□□□□□□□□□□□□□□
 MEM (2) :□□□□□□□□□□□□□□□□
 MEM (3) :□□□□□□□□□□□□□□□□
 MEM (4) :□□□□□□□□□□□□□□□□
 MEM (5) :NEW FILE
```

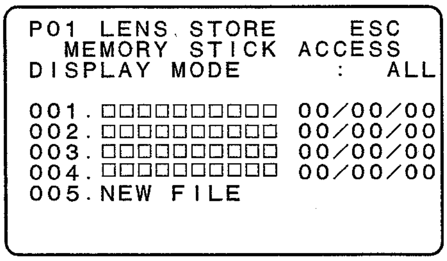
LENS FILE STORE

File selection display (When reading a file from a memory stick/when saving a file to a memory stick)



```
 P01 LENS RECALL    ESC
   MEMORY STICK ACCESS
 DISPLAY MODE       :  ALL
 001.□□□□□□□□□□ 00/00/00
 002.□□□□□□□□□□ 00/00/00
 003.□□□□□□□□□□ 00/00/00
 004.□□□□□□□□□□ 00/00/00
 005.NO FILE
```

LENS FILE RECALL



```
 P01 LENS STORE     ESC
   MEMORY STICK ACCESS
 DISPLAY MODE       :  ALL
 001.□□□□□□□□□□ 00/00/00
 002.□□□□□□□□□□ 00/00/00
 003.□□□□□□□□□□ 00/00/00
 004.□□□□□□□□□□ 00/00/00
 005.NEW FILE
```

LENS FILE STORE

Descriptions of the respective file selection displays are the same as the file selection display of the SCENE FILE display.
For details, refer to the corresponding item of the SCENE FILE display.

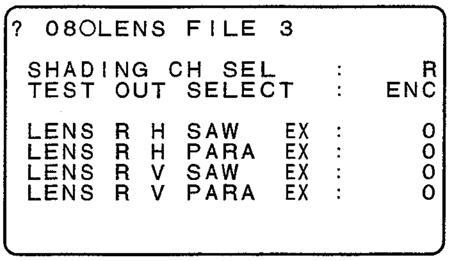
LENS FILE 2 Display (Various adjustments-1 for LENS file)

```
? 07OLENS FILE 2
 LENS M VMOD       :     0
 LENS CENTER H     :     0
 LENS CENTER V     :     0

 TEST OUT SELECT   :   ENC
 LENS R FLARE      :     0
 LENS G FLARE      :     0
 LENS B FLARE      :     0
 LENS W-R OFST     :     0
 LENS W-B OFST     :     0
```

This menu item is displayed when the lens extender is ON or 0.8.
This menu item is blanked when the lens extender is OFF.

Item	Setting	Function
LENS M VMOD	(−99 to 99)	Adjusts the master V. modulation correction value.
LENS CENTER H	−466 to 465	Sets the center marker position. (Horizontal direction)
LENS CENTER V	−121 to 120 (NTSC) −143 to 143 (PAL)	Sets the center marker position. (Vertical direction)
TEST OUT SELECT	ENC/R/G/B	Selects the video signal that is output from the TEST OUT terminal. The output signal returns to the ENC-signal without fail at power-on.
LENS R FLARE	(−99 to 99)	Adjusts the R flare compensation level.
LENS G FLARE	(−99 to 99)	Adjusts the G flare compensation level.
LENS B FLARE	(−99 to 99)	Adjusts the B flare compensation level.
LENS W-R OFST	(−99 to 99)	Adjusts the R white gain offset value.
LENS W-B OFST	(−99 to 99)	Adjusts the B white gain offset value.

LENS FILE 3 Display (Various adjustments-2 on LENS file)



```
? 08OLENS FILE 3

 SHADING CH SEL      :     R
 TEST OUT SELECT     :   ENC

 LENS R H SAW   EX   :     0
 LENS R H PARA  EX   :     0
 LENS R V SAW   EX   :     0
 LENS R V PARA  EX   :     0
```

Item	Setting	Function
SHADING CH SEL	R/G/B/TEST*1	Selects the channel of shading adjustment. When TEST is selected, the channel that you want to adjust, is interlocked with the setting of TEST OUT SELECT. (When ENC is selected by TEST OUT SELECT, the previous channel is set.)
TEST OUT SELECT	ENC/R/G/B	Selects the video signal that is output from the TEST OUT terminal. The output signal returns to the ENC-signal without fail at power-on.
LENS R/G/B H SAW	(−99 to 99)	Adjusts the white H SAW shading.
LENS R/G/B H PARA	(−99 to 99)	Adjusts the white H PARA shading.
LENS R/G/B V SAW	(−99 to 99)	Adjusts the white V SAW shading.
LENS R/G/B V PARA	(−99 to 99)	Adjusts the white V PARA shading.

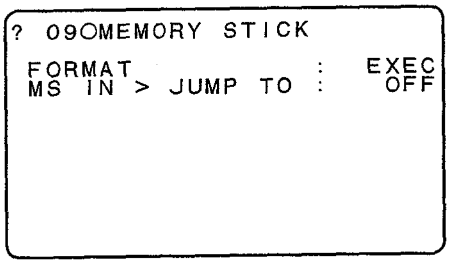
*1 : TEST is displayed only when the unit of which the ROM version of the AT board is 1.40 and higher. You can check the ROM version of the AT board by the ROM VERSION display in the DIAGNOSIS menu.

Note

In the LENS R/G/B V/H SAW and LENS R/G/B V/H PARA, the lens extender position is displayed in the rightmost-end of the menu items.

Blank : OFF
EX : ON
08 : 0.8

MEMORY STICK Display (Function on memory stick)

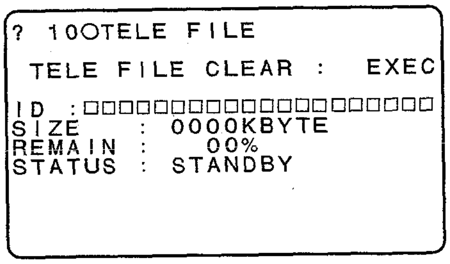


```
? 09OMEMORY STICK
 FORMAT            :   EXEC
 MS IN > JUMP TO  :    OFF
```

Item	Setting	Function
FORMAT	Press the rotary encoder to execute this menu item.	Implements formatting of a memory stick. (All of the data is erased.)
MS IN > JUNP TO*1	OFF/ON	Sets the function that opens the file setup page automatically as a memory stick is inserted when this menu is set to ON. (This function is disabled when the file-related page is opened already.)

*1 : This item is displayed only when the unit of which the ROM version of the AT board is 1.40 and higher. You can check the ROM version of the AT board by the ROM VERSION display in the DIAGNOSIS menu.

TELE FILE Display (Confirming the TELE-FILE information and clearing it)

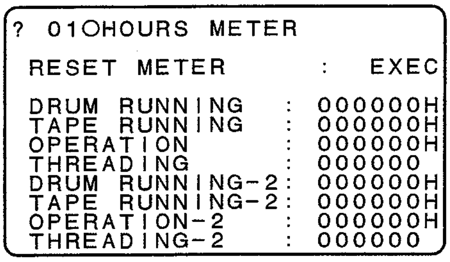


```
? 10OTELE FILE
 TELE FILE CLEAR  :   EXEC
ID     :□□□□□□□□□□□□□□□□□□□□
SIZE   :  0000KBYTE
REMAIN :     00%
STATUS :  STANDBY
```

Item	Setting	Function
TELE FILE CLEAR	Press the rotary encoder and select YES for the confirmation message to execute this menu item.	Clears the CUE point information inside the TELE-FILE.
ID	Display only	Memory label ID (20 characters)
SIZE	Display only	Memory label capacity
REMAIN	Display only	Memory label free capacity
STATUS	Display only	Displays the memory label status. STANDBY : Write enabled NO LABEL : Memory label is not attached. WRITE PROTECT : Over-write is prohibited. UNKNOWN FORMAT : Information of the different models is already written. (Write disabled) NO CASSETTE : Cassette is not inserted. UNFORMAT : The media is not formatted yet. MEMORY FULL : The media does not have a free memory capacity.

4-8. DIAGNOSIS Menu

HOURS METER Display (Confirming and resetting hours meter)

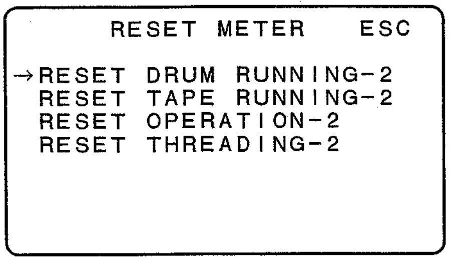


```
? 01OHOURS METER
 RESET METER       :  EXEC
 DRUM RUNNING      : 000000H
 TAPE RUNNING      : 000000H
 OPERATION         : 000000H
 THREADING         : 000000
 DRUM RUNNING-2    : 000000H
 TAPE RUNNING-2    : 000000H
 OPERATION-2       : 000000H
 THREADING-2       : 000000
```

Item	Setting	Function
RESET METER	Press the rotary encoder to move to the RESET METER display.	Resets the hours meters. (For the description of the RESET METER display, refer to the following description.)
DRUM RUNNING	Display only	Accumulated drum rotation hours
TAPE RUNNING	Display only	Accumulated tape running hours
OPERATION	Display only	Accumulated power-on hours
THREADING	Display only	Accumulated number of threading
DRUM RUNNING-2	Display only	Accumulated drum rotation hours (resettable)
TAPE RUNNING-2	Display only	Accumulated tape running hours (resettable)
OPERATION-2	Display only	Accumulated power-on hours (resettable)
THREADING-2	Display only	Accumulated number of threading (resettable)

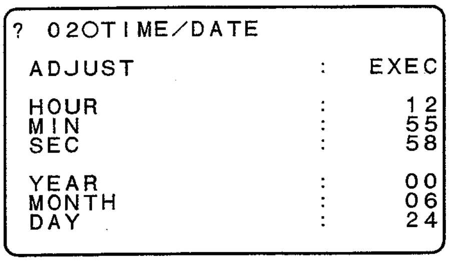
RESET METER display (Selecting the meter to reset)

Select a meter that you want to reset and press the rotary encoder.



```
         RESET METER    ESC

 →RESET DRUM RUNNING-2       ← Drum rotation hours
  RESET TAPE RUNNING-2       ← Tape running hours
  RESET OPERATION-2          ← Power-on hours
  RESET THREADING-2          ← Threading hours
```

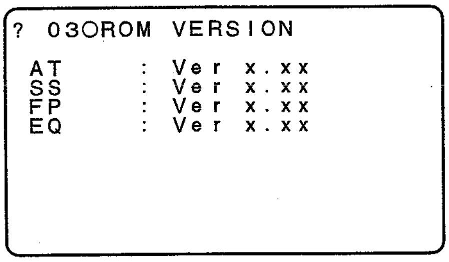
TIME/DATE Display (Confirming and setting date and hour)



```
? 020TIME/DATE
  ADJUST            :    EXEC

  HOUR              :      12
  MIN               :      55
  SEC               :      58

  YEAR              :      00
  MONTH             :      06
  DAY               :      24
```

Item	Setting	Function
ADJUST	Press the rotary encoder. Then theTIME ADJUST display appears.	Sets date and time. (For more details, refer to "4-8-6. Setting the Date/Time of Internal Watch" of Operation Manual.)
HOUR	Display only	Hour
MIN	Display only	Minute
SEC	Display only	Second
YEAR	Display only	Year
MONTH	Display only	Month
DAY	Display only	Day

ROM VERSION Display (Displaying the ROM version)



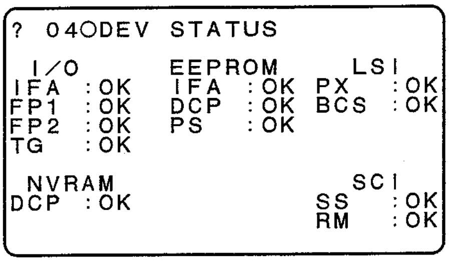
```
? 030ROM  VERSION
  AT      :  Ver  x.xx
  SS      :  Ver  x.xx
  FP      :  Ver  x.xx
  EQ      :  Ver  x.xx
```

Item	Setting	Function
AT	Display only	For IC38/AT-143 board
SS	Display only	For IC8/SS-92 board
FP	Display only	For IC801/FP-121A board
EQ	Display only	For IC1101/EQ-88 board

Note

For the version upgrade procedure of ROM, refer to "1-24. Upgrading the ROM Version".

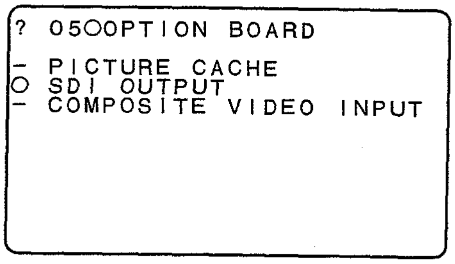
DEV STATUS Display (Checking the communication function of each device)



```
? 040DEV  STATUS

 I/O       EEPROM       LSI
IFA  :OK   IFA  :OK  PX   :OK
FP1  :OK   DCP  :OK  BCS  :OK
FP2  :OK   PS   :OK
TG   :OK

 NVRAM                  SCI
DCP  :OK             SS   :OK
                     RM   :OK
```

Item	Setting	Function
I/O	–	I/O check OK/NG/–– message is displayed. OK : Normal NG : Abnormal –– : The state is not defined.
IFA	OK/NG/––	IC201/IFA-11
FP1	OK/NG/––	IC703/FP-121A
FP2	OK/NG/––	IC704/FP-121A
TG	OK/NG/––	IC3/TG-227
NVRAM	–	NVRAM check
DCP	OK/NG/––	IC10/DCP-35
EEPROM	–	EEPROM check
IFA	OK/NG/––	IC202/IFA-11
DCP	OK/NG/––	IC11/DCP-35
PS	OK/NG/––	IC5/PS-614
LSI	–	LSI check
PX	OK/NG/––	IC315/DCP-35
BCS	OK/NG/––	IC111/TG-227
SCI	–	SCI check
SS	OK/NG/––	Communication with the SS microprocessor
RM	OK/NG/––	Communication with the equipment that is connected to the 8-pin remote connector.

OPTION BOARD Display (Displaying use or not use of optional boards)



```
? 050OPTION BOARD
- PICTURE CACHE
O SDI OUTPUT
- COMPOSITE VIDEO INPUT
```

Item	Setting	Function
PICTURE CACHE	Display only	Use or not use of the PICTURE CACHE board is displayed.[*1] O : Used – : Not used
SDI OUTPUT	Display only	Use or not use of the SDI OUT board is displayed.[*1] O : Used – : Not used
COMPOSITE VIDEO INPUT	Display only	Use or not use of the COMPOSITE VIDEO INPUT board is displayed.[*1] O : Used – : Not used

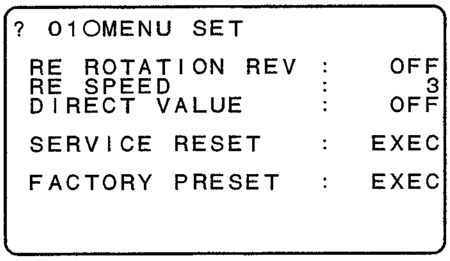
[*1] This display is not reflected on the screen when the main power is turned on after an optional board is installed/removed. It is reflected after turning off the main power once and then back on again.

4-9. SERVICE Menu

Notes

- To enable use of the SERVICE menu, set the switch S1-1/AT-143 board to ON.
- When the range of setting is surrounded by parenthesis ( ) in the setting column, the setup value is the relative value. The range of setting in parenthesis ( ) can be different from what shown in the manual depending on the setting in the layer lower than this menu.

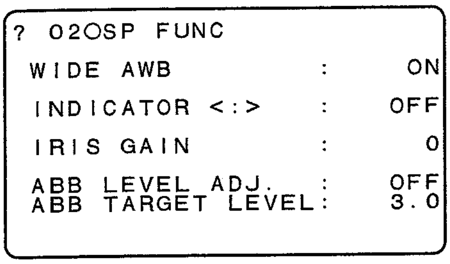
MENU SET Display (Special settings related to the menu)



```
? 010MENU SET
  RE ROTATION REV  :    OFF
  RE SPEED         :      3
  DIRECT VALUE     :    OFF
  SERVICE RESET    :   EXEC
  FACTORY PRESET   :   EXEC
```

Item	Setting	Function
RE ROTATION REV	OFF/ON	Turns ON/OFF the function to invert the rotating direction of rotary encoder.
RE SPEED	1/2/3/4/5	Sets the response speed of rotary encoder. 1 (slow) ↔ 5 (fast)
DIRECT VALUE	OFF/ON	ON : The set value is displayed as it is. OFF : The set value is displayed after converted (in the range of −99 to 99.) (It is returned to OFF when the main power is turned on.)
SERVICE RESET	Press the rotary encoder to execute this menu item.	Resets the data in the SERVICE hierarchy. Refer to "5-2. Data Structure" for details of the hierarchical structure.
FACTORY PRESET	Press the rotary encoder to execute this menu item.	Returns all of the settings to the default setting when shipped from the factory. (Excluding the black balance automatic adjustment value.)

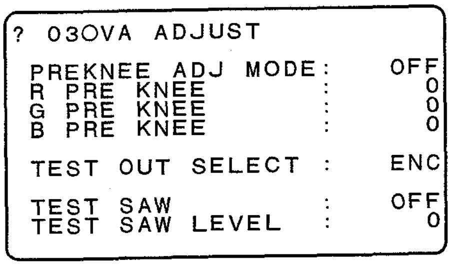
SP FUNC Display (Setting the special functions)



```
? 02OSP FUNC
 WIDE AWB           :    ON
 INDICATOR <:>      :   OFF
 IRIS GAIN          :     0
 ABB LEVEL ADJ.     :   OFF
 ABB TARGET LEVEL:      3.0
```

Item	Setting	Function
WIDE AWB	OFF/ON	Sets whether to use an attenuator (R-ch : +6 dB, B-ch : −6 dB) during white balance automatic adjustment or not to use.
INDICATOR < : >	OFF/SCENE/REFER/ LENS/FACT/TEMP/ SVC/ABS/NOALL/STD/ NOALP/NOINI/INIT	Change the " : " of the each display' s item to" @ ". (Example) When the SCENE is selected. INDICATOR < : > : SCENE the target item (GAMMA) is displayed on screen as GAMMA @ ON OFF : " @ " is not displayed at all items. SCENE : Indicates the items that can be saved in the SCENE file. REFER : Indicates the items that can be saved in the REFERENCE file. LENS : Indicates the items that can be saved in the LENS file. FACT : Indicates the items that the factory set value can be saved in the EEPROM. TEMP: The items that do not have the 1-to-1 storage area with the menu, in the the non-volatile memory. SVC : Indicates the items that can be operated only by the SERVICE mode. ABS : Absolute value (not the relative value with respect to the lower layer) . NOALL : Indicates the items that can't be saved when ALL FILE SAVE and STORE ALL PRESET are executed. STD : Indicates the items that are returned to the standard setup (PRESET value). NOALP : Indicates the items that can't be preset when the ALL PRESET is executed. NOINI : Indicates the items that doesn't return to the default setting when the unit was shipped from the factory at power-on. INIT : Indicates the items that return to the default setting when the unit was shipped from the factory at power-on. Refer to Section " 4-10.Setup Menu List" for the each target item.
IRIS GAIN	(−99 to 99)	Adjusts the gain of AUTO IRIS.
ABB LEVEL ADJ.	OFF/ON	Turning on/off of the function to automatically adjust the black level that is set by ABB TARGET LEVEL.
ABB TARGET LEVEL	0.0 to 10.0	Set the target level of the black level that is obtained during automatic adjustment.

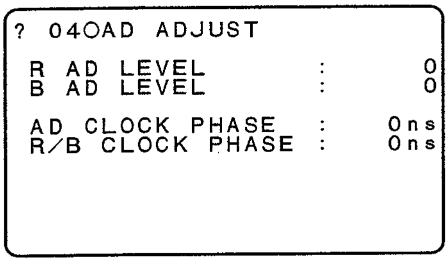
VA ADJUST Display (Adjusting the video amplifier system)



```
? 030VA  ADJUST
 PREKNEE  ADJ  MODE :   OFF
 R  PRE  KNEE       :     0
 G  PRE  KNEE       :     0
 B  PRE  KNEE       :     0
 TEST  OUT  SELECT  :   ENC
 TEST  SAW          :   OFF
 TEST  SAW  LEVEL   :     0
```

Item	Setting	Function
PREKNEE ADJ MODE	OFF/MODE1/MODE2	When this menu item is set to OFF, various settings to enable adjustment of preknee are performed. (For details, refer to "9-14-2. DCC Pre Knee Adjustment".)
R PRE KNEE	(−99 to 99)	Adjusts preknee of the R-channel video signal.
G PRE KNEE	(−99 to 99)	Adjusts preknee of the G-channel video signal.
B PRE KNEE	(−99 to 99)	Adjusts preknee of the B-channel video signal.
TEST OUT SELECT	ENC/R/G/B	Selects the video signal that is output from the TEST OUT terminal. The output signal returns to the ENC-signal without fail at power-on.
TEST SAW	OFF/ON	Turns ON/OFF the function that outputs the TEST signal forcibly to the video signal system.
TEST SAW LEVEL	(−99 to 99)	Adjusts the level of the TEST SAW.

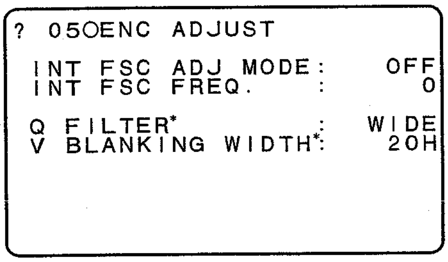
AD ADJUST (Adjusting the AD converter)



```
? 040AD ADJUST
 R AD LEVEL          :      0
 B AD LEVEL          :      0

 AD CLOCK PHASE      :    0ns
 R/B CLOCK PHASE     :    0ns
```

Item	Setting	Function
R AD LEVEL	(−99 to 99)	Adjusts the R AD convert level gain.
B AD LEVEL	(−99 to 99)	Adjusts the B AD convert level gain.
AD CLOCK PHASE	0/4/9/13/17/22 (ns)	Adjusts the CLOCK phase (G-ch) which input to tne AD converter.
R/B CLOCK PHASE	0/4/9/13/17/22 (ns)	Adjusts the CLOCK phase (R/B-ch) which input to tne AD converter.

ENC ADJUST (Adjusting the DCP board)

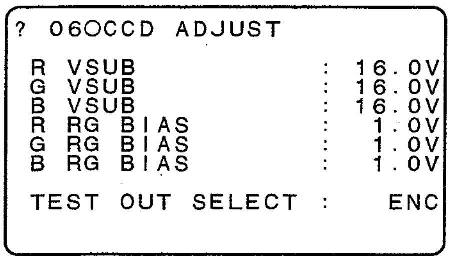


```
? 050ENC ADJUST
 INT FSC ADJ MODE:     OFF
 INT FSC FREQ.   :       0

 Q FILTER*       :    WIDE
 V BLANKING WIDTH*:    20H
```

* : It is displayed only when the Camcoder is set to be NTSC.

Item	Setting	Function
INT FSC ADJ MODE	OFF/ON	Turns ON/OFF the mode of the free-running frequency of VCO.
INT FSC FREQ.	(−99 to 99)	Adjusts the free-running frequency of VCO.
Q FILTER*	WIDE/NARROW	Sets the Q filter of the analog composite output signal from camera. (Setting of this item does not affect the SDI signal and the recording picture.) WIDE : Wider bandwidth of Q filter is selected. NARROW : Narrower bandwidth of Q filter is selected.
V BLANG WIDTH*	20H/21H	Adjusts the vertical blanking width.

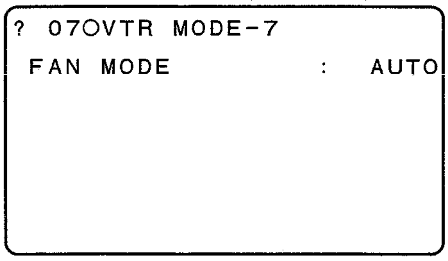
CCD ADJUST Display (Adjusting CCD block)



```
? 060CCD ADJUST
 R VSUB              :  16.0V
 G VSUB              :  16.0V
 B VSUB              :  16.0V
 R RG BIAS           :   1.0V
 G RG BIAS           :   1.0V
 B RG BIAS           :   1.0V
 TEST OUT SELECT     :    ENC
```

Item	Setting	Function
R VSUB	9.0 V to 18.0 V	Sets the V. substrate voltage value of the R-channel.
G VSUB	9.0 V to 18.0 V	Sets the V. substrate voltage value of the G-channel.
B VSUB	9.0 V to 18.0 V	Sets the V. substrate voltage value of the B-channel.
R RG BIAS	0.0 V to 3.0 V	Sets the reset gate bias voltage value of the R-channel.
G RG BIAS	0.0 V to 3.0 V	Sets the reset gate bias voltage value of the G-channel.
B RG BIAS	0.0 V to 3.0 V	Sets the reset gate bias voltage value of the B-channel.
TEST OUT SELECT	ENC/R/G/B	Selects the video signal that is output from the TEST OUT terminal. The output signal returns to the ENC-signal without fail at power-on.

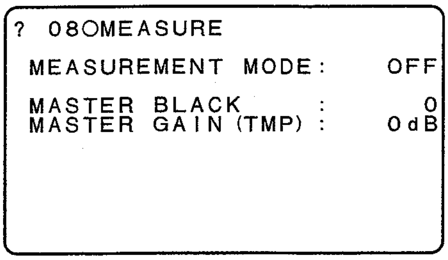
VTR MODE-7 Display (Setting-7 on VTR)



```
? 070VTR MODE-7
 FAN MODE            :   AUTO
```

Item	Setting	Function
FAN MODE	AUTO/FIX	Sets the fan mode. Use the fan in the AUTO position normally. AUTO : Temperature increase inside the unit is detected and the fan is automatically controlled. FIX : The fan is controlled with the fixed voltage (8 V). (For the operation check of the fan)

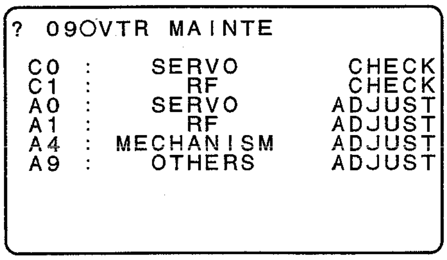
MEASURE Display (Setting the measurement mode)



```
? 08OMEASURE
 MEASUREMENT MODE:    OFF
 MASTER BLACK     :     0
 MASTER GAIN (TMP) :  0dB
```

Item	Setting	Function
MEASUREMENT MODE	OFF/S/N/MODU/RESO/ SENS/REGI	Selects the measurement mode. S/N : S/N ratio measurement mode MODU : Modulation measurement mode RESO : Resolution measurement mode SENS : Sensitivity measurement mode REGI : Registration measurement mode
MASTER BLACK	(−99 to 99)	Adjusts the master black level. (All of the R, G and B signal black levels are adjusted.)
MASTER GAIN (TMP)	−3/0/3/6/9/12/18/24/30/ 36/42/48	Sets the temporary gain value.

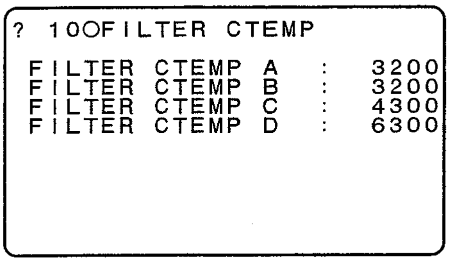
VTR MAINTE Display (VTR maintenance)



```
? 09OVTR MAINTE
 C0 :    SERVO      CHECK
 C1 :      RF       CHECK
 A0 :    SERVO     ADJUST
 A1 :      RF      ADJUST
 A4 :  MECHANISM   ADJUST
 A9 :    OTHERS    ADJUST
```

Item	Setting	Function
C0 : SERVO CHECK	When the rotary encoder is pressed, the SERVO CHECK MENU display appears.	Diagnoses the servo system. (For details, refer to "11-3-1. Servo System Self-diagnosis Mode".)
C1 : RF CHECK	When the rotary encoder is pressed, the RF CHECK MENU display appears.	Checks the error rate during recording and playback mode. (For details, refer to "11-3-2. RF System Self-diagnosis Mode".)
A0 : SERVO ADJUST	When the rotary encoder is pressed, the SERVO ADJUST MENU display appears.	Adjusts the servo system. (For details, refer to "11-3-3. Servo System Adjustment Mode.")
A1 : RF ADJUST	When the rotary encoder is pressed, the RF ADJUST MENU display appears.	Adjusts the RF system. (For details, refer to "11-3-4. RF System Adjustment Mode.")
A4 : MECHANISM ADJUST	When the rotary encoder is pressed, the MECHANISM ADJUST MENU display appears.	Adjusts the mechanism. (For details, refer to "11-3-5 Mechanism Adjustment Mode.")
A9 : OTHERS ADJUST	When the rotary encoder is pressed, the OTHERS ADJUST MENU display appears.	Compensates for the voltage drop by the internal circuit and adjustment when the MDC-13A board is replaced. (For details, refer to "11-3-6. Other Adjustments".)

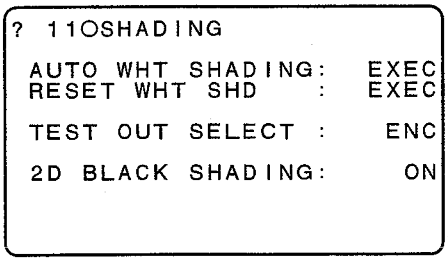
FILTER CTEMP DISPLAY (Setting of color temperature)



```
? 10OFILTER CTEMP
 FILTER CTEMP A  :   3200
 FILTER CTEMP B  :   3200
 FILTER CTEMP C  :   4300
 FILTER CTEMP D  :   6300
```

Item	Setting	Function
FILTER CTEMP A	2000 to 10000	Sets the color temperature of the color temperature filter A.
FILTER CTEMP B	2000 to 10000	Sets the color temperature of the color temperature filter B.
FILTER CTEMP C	2000 to 10000	Sets the color temperature of the color temperature filter C.
FILTER CTEMP D	2000 to 10000	Sets the color temperature of the color temperature filter D.

SHADING Display*1 (Adjusting the shading)



```
? 11OSHADING
 AUTO WHT SHADING:   EXEC
 RESET WHT SHD   :   EXEC

 TEST OUT SELECT :    ENC

 2D BLACK SHADING:     ON
```

Item	Setting	Function
AUTO WHT SHADING	Press the rotary encoder to execute this menu item.	Starts to adjust the white shading automatically.
RESET WHT SHD	Press the rotary encoder to execute this menu item.	Returns the white shading value to the default value when manufactured in the production plant.
TEST OUT SELECT	ENC/R/G/B	Selects the video signal that is output from the TEST OUT terminal. The output signal returns to the ENC-signal without fail at power-on.
2D BLACK SHADING	OFF/ON	Turns ON/OFF the function to add the 2D black shading (surface shading) in the white shading automatic adjustment.

*1 : This item is displayed only when the unit of which the ROM version of the AT board is 1.40 and higher. You can check the ROM version of the AT board by the ROM VERSION display in the DIAGNOSIS menu.

4-10. Setup Menu List

The data that is set by the Setup menu can be saved in files. (Refer to Section 5 for the details of the file system.)
This section shows the list covering all the items of the setup menu. The following list shows the respective default settings when the unit was shipped from the factory and the destination files to which the respective menu items can be saved.

F-SET : Indicates the default setting when the unit was shipped from the factory.
C-SET : (Expected to write down the customers' setup conditions.)
ALL : Indicates the items that can be saved when the ALL FILE SAVE and STORE ALL PRESET are executed. The items are indicated by the symbols.
PRESET : Indicates the items that can be preset when the ALL PRESET is executed. The items are indicated by the symbols.
SCENE : Indicates the items that can be saved in the SCENE file when the SCENE STORE is executed. The items are indicated by the symbols.
REFER : Indicates the items that can be saved in the REFERENCE file when the REFERENCE SAVE/STORE is executed. The items are indicated by the symbols.
LENS : Indicates the items that can be saved in the LENS file when the LENS FILE STORE is executed. The items are indicated by the symbols.
STD : The items that are returned to the standard setup (PRESET value) when the STANDARD submenu is clicked.
Power OFF : Indicates the items that return to the default setting when the unit was shipped from the factory at power-off.

Symbols
◎ : Can be saved. (The menu display value remains as it is even after saving.)
○ : Can be saved. (The menu display value becomes 0 when it is saved.)
× : Cannot be saved.
☆ : Special saving items. (Refer to "5-8. Special Saving Items".)
★ : Special saving items. (When an absolute value exists, the switch value has priority (Refer to "5-8. Special Saving Items".))

Note

The items that have the crossing mark × (cannot be saved) in their ALL and PRESET columns, can be the target of the USER file and USER PRESET if the items are located in the USER menu. However, the items that return to the default setting when the unit was shipped from the factory at power-OFF, are excluded from the target.

1. OPERATION Menu

No.	Page	Setup Item	F-SET	C-SET	ALL	PRSET	SCENE	REFER	LENS	STD	Power OFF
01	OUTPUT SEL	REAR BNC OUT SEL	VBS		◎	◎	×	×	×	×	–
02	TEST OUT	TEST OUT MARKER	OFF		◎	◎	×	×	×	×	–
		TEST OUT VFDISP	OFF		◎	◎	×	×	×	×	–
		TEST OUT MENU	OFF		◎	◎	×	×	×	×	–
		TEST OUT ZEBRA	OFF		◎	◎	×	×	×	×	–
		TEST OUT TC	OFF		◎	◎	×	×	×	×	–
		TEST OUT SELECT	ENC		◎	◎	×	×	×	○	ENC
03	FUNCTION1	ASSIGN SW <1>	ATW		◎	◎	×	×	×	×	–
		ASSIGN SW <2>	OFF		◎	◎	×	×	×	×	–
		DF/NDF	DF		◎	◎	×	×	×	×	–
		END SEARCH	OFF		◎	◎	×	×	×	×	–
		LOOP/INTVAL REC	OFF		◎	◎	×	×	×	×	It is set to OFF when A.INT/M.INT is selected.
		LOOP REC TIME	0SEC		◎	◎	×	×	×	×	–
		TAKE TOTAL TIME	5MIN		◎	◎	×	×	×	×	–
		REC TIME	5SEC		◎	◎	×	×	×	×	–
		NUMBER OF FRAME	1		◎	◎	×	×	×	×	–
		PRE-LIGHTING	OFF		◎	◎	×	×	×	×	–
		TRIGGER INTERVAL	M		◎	◎	×	×	×	×	–
04	FUNCTION 2	WHITE SWITCH <B>	MEM		◎	◎	×	×	×	×	–
		SHOCKLESS WHITE	1		◎	◎	×	×	×	×	–
		LOW LIGHT	OFF		◎	◎	×	×	×	×	–
		LOW LIGHT LEVEL	0		◎	○	×	×	×	×	–
		VF BATT WARNING	10%		◎	◎	×	×	×	×	–
05	VF DISP 1	VF DISP	ON		×	×	×	×	×	×	Depends on the VF switch
		VF DISPLAY MODE	3		◎	◎	×	×	×	×	–
		DISP EXTENDER	ON		◎	◎	×	×	×	×	–
		DISP FILTER	ON		◎	◎	×	×	×	×	–
		DISP WHITE	ON		◎	◎	×	×	×	×	–
		DISP GAIN	ON		◎	◎	×	×	×	×	–
		DISP SHUTTER	ON		◎	◎	×	×	×	×	–
		DISP AUDIO	ON		◎	◎	×	×	×	×	–
		DISP TAPE	ON		◎	◎	×	×	×	×	–
		DISP IRIS	ON		◎	◎	×	×	×	×	–
06	VF DISP 2	DISP ZOOM	ON		◎	◎	×	×	×	×	–
		DISP COLOR TEMP	OFF		◎	◎	×	×	×	×	–
		DISP VOLT	OFF		◎	◎	×	×	×	×	–
		DISP DC IN	OFF		◎	◎	×	×	×	×	–
		DISP 16 : 9 ID	OFF		◎	◎	×	×	×	×	–
		DISP WRR RF LVL	OFF		◎	◎	×	×	×	×	–
		DISP TIME CODE	OFF		◎	◎	×	×	×	×	–

No.	Page	Setup Item	F-SET	C-SET	ALL	PRSET	SCENE	REFER	LENS	STD	Power OFF
07	'!' LED	GAIN <!>	ON		◎	◎	×	×	×	×	–
		SHUTTER <!>	ON		◎	◎	×	×	×	×	–
		WHT PRESET <!>	ON		◎	◎	×	×	×	×	–
		ATW RUN <!>	ON		◎	◎	×	×	×	×	–
		EXTENDER <!>	ON		◎	◎	×	×	×	×	–
		FILTER <!>	OFF		◎	◎	×	×	×	×	–
		OVERRIDE <!>	ON		◎	◎	×	×	×	×	–
08	MARKER 1	MARKER	OFF		◎	◎	×	×	×	×	–
		CENTER	OFF		◎	◎	×	×	×	×	–
		SAFETY ZONE	OFF		◎	◎	×	×	×	×	–
		SAFETY AREA	90%		◎	◎	×	×	×	×	–
		ASPECT	OFF		◎	◎	×	×	×	×	–
		ASPECT SELECT	4 : 3		◎	◎	×	×	×	×	–
		ASPECT MASK (4:3)	OFF		◎	◎	×	×	×	×	–
		ASPECT MASK LVL	1/4		◎	◎	×	×	×	×	–
		100% MARKER	OFF		◎	◎	×	×	×	×	–
09	MARKER 2	USER BOX	OFF		◎	◎	×	×	×	×	–
		USER BOX WIDTH	245		◎	◎	×	×	×	×	–
		USER BOX HEIGHT	72		◎	◎	×	×	×	×	–
		USER BOX H POS.	0		◎	◎	×	×	×	×	–
		USER BOX V POS.	0		◎	◎	×	×	×	×	–
		CENTER H POS.	0		◎	◎	×	×	×	×	–
		CENTER V POS.	0		◎	◎	×	×	×	×	–
10	GAIN SW	GAIN LOW	0dB		◎	◎	×	×	×	×	–
		GAIN MID	9dB		◎	◎	×	×	×	×	–
		GAIN HIGH	18dB		◎	◎	×	×	×	×	–
		GAIN TURBO	42dB		◎	◎	×	×	×	×	–
		TURBO SW IND.	OFF		◎	◎	×	×	×	×	–
11	VF SETTING	ZEBRA	OFF		×	×	×	×	×	×	Depends on the VF switch.
		ZEBRA SELECT	1		◎	◎	×	×	×	×	–
		ZEBRA1 DET.LVL	70		◎	◎	×	×	×	×	–
		ZEBRA1 APT.LVL	10		◎	◎	×	×	×	×	–
		ZEBRA2 DET.LVL	100		◎	◎	×	×	×	×	–
		VF DETAIL LEVEL	0		◎	○	×	×	×	×	–
12	AUTO IRIS	IRIS OVERRIDE	OFF		◎	◎	×	×	×	×	–
		IRIS SPEED	2		◎	◎	×	◎	×	○	–
		CLIP HIGH LIGHT	OFF		◎	◎	×	◎	×	○	–
		IRIS WINDOW	1		◎	◎	×	◎	×	○	–
		IRIS WINDOW IND.	OFF		×	×	×	×	×	○	OFF
		IRIS VAR WIDTH	245		◎	◎	×	◎	×	○	–
		IRIS VAR HEIGHT	72		◎	◎	×	◎	×	○	–
		IRIS VAR H POS.	0		◎	◎	×	◎	×	○	–
		IRIS VAR V POS.	0		◎	◎	×	◎	×	○	–

No.	Page	Setup Item	F-SET	C-SET	ALL	PRSET	SCENE	REFER	LENS	STD	Power OFF
13	SHOT ID	ID-1	–		◎	×	×	×	×	×	–
		ID-2	–		◎	×	×	×	×	×	–
		ID-3	–		◎	×	×	×	×	×	–
		ID-4	–		◎	×	×	×	×	×	–
14	SHOT DISP	SHOT DATE	OFF		◎	◎	×	×	×	×	–
		SHOT TIME	OFF		◎	◎	×	×	×	×	–
		SHOT MODEL NAME	OFF		◎	◎	×	×	×	×	–
		SHOT SERIAL NO	OFF		◎	◎	×	×	×	×	–
		SHOT ID SEL	OFF		◎	◎	×	×	×	×	–
		SHOT 16 : 9 ID	OFF		◎	◎	×	×	×	×	–
		SHOT BLINK CHARA	OFF		◎	◎	×	×	×	×	–
15	SET STATUS	STATUS ABNORMAL	ON		◎	◎	×	×	×	×	–
		STATUS FUNCTION	ON		◎	◎	×	×	×	×	–
		STATUS AUDIO	ON		◎	◎	×	×	×	×	–
16	OFFSET WHT	OFFSET WHITE <A>	OFF		◎	◎	×	×	×	×	–
		WARM-COOL <A>	3200		◎	◎	×	×	×	×	–
		COLOR FINE <A>	0		◎	◎	×	×	×	×	–
		OFFSET WHITE <B>	OFF		◎	◎	×	×	×	×	–
		WARM-COOL <B>	3200		◎	◎	×	×	×	×	–
		COLOR FINE <B>	0		◎	◎	×	×	×	×	–
17	SHT ENABLE	SHUTTER ECS	ON		◎	◎	×	×	×	×	–
		SHUTTER 1/60 (PAL) SHUTTER 1/100 (NTSC)	ON		◎	◎	×	×	×	×	–
		SHUTTER 1/125	ON		◎	◎	×	×	×	×	–
		SHUTTER 1/250	ON		◎	◎	×	×	×	×	–
		SHUTTER 1/500	ON		◎	◎	×	×	×	×	–
		SHUTTER 1/1000	ON		◎	◎	×	×	×	×	–
		SHUTTER 1/2000	ON		◎	◎	×	×	×	×	–
18	LENS FILE	LENS FILE SELECT	1		×	×	×	×	×	×	–
		F. ID	–		×	×	×	×	◎	×	–
19	FORMAT	16 : 9/4 : 3 SELECT	16 : 9		◎	◎	×	×	×	×	–
		SCAN MODE	I		◎	◎	×	×	×	×	–
		REVERSE IMAGE	OFF		◎	◎	×	×	×	×	–
		H DELAY (REV.IMG)	0		◎	◎	×	×	×	×	–
		UC/J SELECT	UC		◎	◎	×	×	×	×	NTSC only
20	EXT VIDEO IN	REC VIDEO SOURCE	CAM		◎	◎	×	×	×	×	–
		EE DELAY	SYNC		◎	◎	×	×	×	×	–
		SETUP REMOVE*	7.5 %		◎	◎	×	×	×	×	–

** : It is displayed only when UC is selected in the item UC/J SELECT on the 19OFORMAT display in the NTSC mode.*

2. PAINT Menu

No.	Page	Setup Item	F-SET	C-SET	ALL	PRSET	SCENE	REFER	LENS	STD	Power OFF
01	SW STATUS	GAMMA	ON		◎	◎	◎	×	×	○	–
		CHROMA	ON		◎	◎	◎	◎	×	○	–
		MATRIX	ON		◎	◎	◎	◎	×	○	–
		KNEE	ON		◎	◎	◎	◎	×	○	–
		WHITE CLIP	ON		◎	◎	◎	×	×	○	–
		DETAIL	ON		◎	◎	◎	◎	×	○	–
		APERTURE	ON		◎	◎	◎	◎	×	○	–
		FLARE	ON		◎	◎	◎	×	×	○	–
		EVS	OFF		◎	◎	◎	◎	×	○	–
		TEST SAW	OFF		◎	◎	×	×	×	○	–
02	WHITE	COLOR TEMP <A>	3200		☆	×	☆	☆	×	☆	–
		COLOR FINE <A>	0		☆	×	☆	☆	×	☆	–
		R GAIN <A>	0		☆	×	☆	☆	×	☆	–
		B GAIN <A>	0		☆	×	☆	☆	×	☆	–
		COLOR TEMP <B>	3200		☆	×	☆	☆	×	☆	–
		COLOR FINE <B>	0		☆	×	☆	☆	×	☆	–
		R GAIN <B>	0		☆	×	☆	☆	×	☆	–
		B GAIN <B>	0		☆	×	☆	☆	×	☆	–
03	BLACK/FLARE	MASTER BLACK	0		◎	○	◎	○	×	○	–
		R BLACK	0		◎	○	◎	×	×	○	–/0
		B BLACK	0		◎	○	◎	×	×	○	–/0
		MASTER FLARE	0		◎	○	◎	○	×	○	–
		R FLARE	0		◎	○	◎	○	×	○	–
		G FLARE	0		◎	○	◎	○	×	○	–
		B FLARE	0		◎	○	◎	○	×	○	–
		FLARE	ON		◎	◎	◎	×	×	○	–
		TEST OUT SELECT	ENC		×	×	×	×	×	○	ENC
04	GAMMA	GAMMA	ON		◎	◎	◎	×	×	○	–
		STEP GAMMA	0.45		◎	◎	◎	◎	×	○	–
		MASTER GAMMA	0		◎	○	◎	○	×	○	–
		R GAMMA	0		◎	○	◎	○	×	○	–
		G GAMMA	0		◎	○	◎	○	×	○	–
		B GAMMA	0		◎	○	◎	○	×	○	–
		TEST OUT SELECT	ENC		×	×	×	×	×	○	ENC
		GAMMA SELECT	STD		◎	◎	◎	◎	×	○	–
		GAM SEL (STD)	3		◎	◎	◎	◎	×	○	–
		GAM SEL (FILM)	1		◎	◎	◎	◎	×	○	–

No.	Page	Setup Item	F-SET	C-SET	ALL	PRSET	SCENE	REFER	LENS	STD	Power OFF
05	BLK GAMMA	BLACK GAMMA	OFF		◎	◎	◎	◎	×	○	–
		BLK GAMMA RANGE	HIGH		◎	◎	◎	◎	×	○	–
		MASTER BLK GAMMA	0		◎	○	◎	○	×	○	–
		R BLACK GAMMA	0		◎	○	◎	○	×	○	–
		G BLACK GAMMA	0		◎	○	◎	○	×	○	–
		B BLACK GAMMA	0		◎	○	◎	○	×	○	–
		TEST OUT SELECT	ENC		×	×	×	×	×	○	ENC
06	KNEE	KNEE	ON		◎	◎	◎	◎	×	○	–
		KNEE POINT	85		◎	◎	◎	◎	×	○	–
		KNEE SLOPE	0		◎	○	◎	○	×	○	–
		KNEE SATURATION	ON		◎	◎	◎	◎	×	○	–
		KNEE SAT LEVEL	0		◎	○	◎	○	×	○	–
		WHITE CLIP	ON		◎	◎	◎	×	×	○	–
		WHITE CLIP LEVEL	NTSC : 109.0 PAL : 105.0		◎	◎	◎	◎	×	○	–
07	DETAIL1	DETAIL	ON		◎	◎	◎	◎	×	○	–
		APERTURE	ON		◎	◎	◎	◎	×	○	–
		DETAIL LEVEL	0		◎	○	◎	○	×	○	–
		APERTURE LVL	0		◎	○	◎	○	×	○	–
		DTL H/V RATIO	0		◎	○	◎	○	×	○	–
		CRISPENING	0		◎	○	◎	○	×	○	–
		LEVEL DEPEND	ON		◎	◎	◎	◎	×	○	–
		LV. DEPEND LVL	0		◎	○	◎	○	×	○	–
		DETAIL FREQ.	0		◎	○	◎	○	×	○	–
08	DETAIL2	KNEE APERTURE	OFF		◎	◎	◎	◎	×	○	–
		KNEE APT LVL	0		◎	○	◎	○	×	○	–
		DETAIL COMB	0		◎	○	◎	○	×	○	–
		CROSS COLOR	OFF		◎	◎	◎	◎	×	○	–
		CROSS COLOR LVL	0		◎	○	◎	○	×	○	–
		DETAIL LIMIT	0		◎	○	◎	○	×	○	–
		DTL WHT LIMIT	0		◎	○	◎	○	×	○	–
		DTL BLK LMT	0		◎	○	◎	○	×	○	–
		DTL V-BLK LMT	0		◎	○	◎	○	×	○	–
09	DETAIL3	FINE DTL	OFF		◎	◎	◎	◎	×	○	–
		FINE DTL LVL	0		◎	○	◎	○	×	○	–
		V DTL CREATION	R+G		◎	◎	◎	◎	×	○	–
		H/V CONTROL MODE	V		◎	◎	×	◎	×	○	–

No.	Page	Setup Item	F-SET	C-SET	ALL	PRSET	SCENE	REFER	LENS	STD	Power OFF
10	SKIN DETAIL	SKIN DETAIL ALL	OFF		◎	◎	◎	◎	×	○	–
		SKIN AREA IND.	OFF		×	×	×	×	×	○	OFF
		SKIN DTL SELECT	1		×	×	×	×	×	○	1
		SKIN DETAIL	ON		◎	◎	◎	◎	×	○	–
		SKIN DETAIL LVL	0		◎	○	◎	○	×	○	–
		SKIN DTL SAT.	0		◎	○	◎	○	×	○	–
		SKIN DTL HUE	0		◎	◎	◎	◎	×	○	–
		SKIN DTL WIDTH	40		◎	◎	◎	◎	×	○	–
11	MTX LINEAR	MATRIX	ON		◎	◎	◎	◎	×	○	–
		MATRIX (USER)	OFF		◎	◎	◎	◎	×	○	–
		MATRIX (PRESET)	ON		◎	◎	◎	◎	×	○	–
		MATRIX G-R	0		◎	○	◎	○	×	○	–
		MATRIX B-R	0		◎	○	◎	○	×	○	–
		MATRIX R-G	0		◎	○	◎	○	×	○	–
		MATRIX B-G	0		◎	○	◎	○	×	○	–
		MATRIX R-B	0		◎	○	◎	○	×	○	–
		MATRIX G-B	0		◎	○	◎	○	×	○	–
12	MTX MULTI	MATRIX	ON		◎	◎	◎	◎	×	○	–
		MATRIX (MULTI)	OFF		◎	◎	◎	◎	×	○	–
		MATRIX AREA IND.	OFF		×	×	×	×	×	○	OFF
		MTX (MULTI) AXIS	B		×	×	×	×	×	○	B
		MTX (MULTI) HUE	0		◎	○	◎	○	×	○	–
		MTX (MULTI) SAT	0		◎	○	◎	○	×	○	–
13	V MODULATION	VMOD	ON		◎	◎	×	×	×	○	–
		MASTER VMOD	0		◎	○	◎	×	×	○	–
		R VMOD	0		◎	○	◎	×	×	○	–
		G VMOD	0		◎	○	◎	×	×	○	–
		B VMOD	0		◎	○	◎	×	×	○	–
		TEST OUT SELECT	ENC		×	×	×	×	×	○	ENC
14	LOW KEY SAT.	LOW KEY SAT.	OFF		◎	◎	◎	◎	×	○	–
		L. KEY SAT. LEVEL	0		◎	○	◎	○	×	○	–
		L. KEY SAT. RANGE	HIGH		◎	◎	◎	◎	×	○	–
		Y BLACK GAMMA	OFF		◎	◎	◎	◎	×	○	–
		Y BLK GAM LEVEL	0		◎	○	◎	○	×	○	–
		Y BLK GAM RANGE	HIGH		◎	◎	◎	◎	×	○	Y
15	SCENE FILE	1 to 5	–		–	–	–	–	–	–	–
		STANDARD	–		–	–	–	–	–	–	–
		SCENE RECALL	–		–	–	–	–	–	–	–
		SCENE STORE	–		–	–	–	–	–	–	–
		F.ID	–		×	×	×	×	×	×	–

3. MAINTENANCE Menu

No.	Page	Setup Item	F-SET	C-SET	ALL	PRSET	SCENE	REFER	LENS	STD	Power OFF
01	WHT SHADING	SHADING CH SEL	R		×	×	×	×	×	○	R
		TEST OUT SELECT	ENC		×	×	×	×	×	○	ENC
		R/G/B WHT H SAW	0		×	○	×	×	×	×	–
		R/G/B WHT H PARA	0		×	○	×	×	×	×	–
		R/G/B WHT V SAW	0		×	○	×	×	×	×	–
		R/G/B WHT V PARA	0		×	○	×	×	×	×	–
		WHITE SAW/PARA	ON		×	×	×	×	×	○	ON
02	BLK SHADING	SHADING CH SEL	R		×	×	×	×	×	○	R
		TEST OUT SELECT	ENC		×	×	×	×	×	○	ENC
		R/G/B BLK H SAW	0		×	○	×	×	×	×	–
		R/G/B BLK H PARA	0		×	○	×	×	×	×	–
		R/G/B BLK V SAW	0		×	○	×	×	×	×	–
		R/G/B BLK V PARA	0		×	○	×	×	×	×	–
		BLACK SAW/PARA	ON		×	×	×	×	×	○	ON
		MASTER BLACK	0		◎	○	◎	○	×	○	REFER
		MASTER GAIN(TMP)	Depends on the GAIN switch.		×	×	★	★	×	★	Depends on the GAIN switch.
03	LEVEL ADJ	ENC VIDEO LEVEL	0		×	○	×	×	×	×	–
		RGB LEVEL	0		×	○	×	×	×	×	–
		TEST OUT SELECT	ENC		×	×	×	×	×	○	ENC
04	BATTERY	BEFORE END	11.3V		◎	◎	×	×	×	×	–
		END	11.0V		◎	◎	×	×	×	×	–
05	VTR MODE-1	V/A OUT (FF/REW)	EE		◎	◎	×	×	×	×	–
		REC AUDIO OUT	EE		◎	◎	×	×	×	×	–
		CA-701 AUDIO IN	ENABL		◎	◎	×	×	×	×	–
		AUDIO CH3/4 MODE	CH1/2		◎	◎	×	×	×	×	–
		REAR XLR AUTO	ON		◎	◎	×	×	×	×	–
		FRONT MIC REF	–60 dB		◎	◎	×	×	×	×	–
		REAR1 MIC REF	–60 dB		◎	◎	×	×	×	×	–
		REAR2 MIC REF	–60 dB		◎	◎	×	×	×	×	–

No.	Page	Setup Item	F-SET	C-SET	ALL	PRSET	SCENE	REFER	LENS	STD	Power OFF
06	VTR MODE-2	AU DATA LENGTH	16 bit		◎	◎	×	×	×	×	–
		AU REC EMPHASYS	OFF		◎	◎	×	×	×	×	–
		AU REF LEVEL	–20dB		◎	◎	×	×	×	×	–
		AU REF OUT	0dB		◎	◎	×	×	×	×	–
		AU SG (1KHz)	OFF		◎	◎	×	×	×	×	–
		MIC CH1 LEVEL	FRONT		◎	◎	×	×	×	×	–
		MIC CH2 LEVEL	FRONT		◎	◎	×	×	×	×	–
		REAR1/WRR LEVEL	SIDE1		◎	◎	×	×	×	×	–
		REAR2/WRR LEVEL	SIDE2		◎	◎	×	×	×	×	–
07	VTR MODE-3	TC OUT	AUTO		◎	◎	×	×	×	×	–
		DF/NDF	DF		◎	◎	×	×	×	×	–
		EXT-LK DF/NDF	INT		◎	◎	×	×	×	×	–
		EXT-LK UBIT	INT		◎	◎	×	×	×	×	–
		LTC UBIT	FIX		◎	◎	×	×	×	×	–
		VITC UBIT	FIX		◎	◎	×	×	×	×	–
		WATCH AUTO ADJ	ON		◎	◎	×	×	×	×	–
		UBIT GROUP ID	000		◎	◎	×	×	×	×	–
		VITC INS LINE 1	NTSC : 16H PAL : 19H		◎	◎	×	×	×	×	–
		VITC INS LINE 2	NTSC : 18H PAL : 21H		◎	◎	×	×	×	×	–
08	VTR MODE-4	REC TALLY BLINK	ON		◎	◎	×	×	×	×	–
		REC START/STOP	OFF		◎	◎	×	×	×	×	–
		MODE SELECT	SEL		◎	◎	×	×	×	×	–
		TIMER SET	1H		◎	◎	×	×	×	×	–
		STBY OFF TIMER	60MIN		◎	◎	×	×	×	×	–
		STOP KEY FREEZE	OFF		◎	◎	×	×	×	×	–
09	VTR MODE-5	LTC UB-MARKER	SET		◎	◎	×	×	×	×	–
		REC START MARK	OFF		◎	◎	×	×	×	×	–
		SHOT MARKER 1	OFF		◎	◎	×	×	×	×	–
		SHOT MARKER 2	OFF		◎	◎	×	×	×	×	–
		SHOT TIME DISP	MD : HM		◎	◎	×	×	×	×	–
10	PRESET WHT	COLOR TEMP. <P>	3200		◎	◎	×	×	×	×	–
		COLOR FINE <P>	0		◎	◎	×	×	×	×	–
		R GAIN <P>	0		◎	○	×	×	×	×	–
		B GAIN <P>	0		◎	○	×	×	×	×	–
		AWB ENABLE <P>	OFF		×	×	×	×	×	○	OFF
11	DCC ADJUST	DCC FUNCTION SEL	DCC		◎	◎	×	◎	×	○	–
		DCC D RANGE	600%		◎	◎	×	◎	×	○	–
		DCC POINT	0		◎	○	×	○	×	○	–
		DCC GAIN	0		◎	○	×	○	×	○	–
		DCC DELAY TIME	0		◎	○	×	○	×	○	–

No.	Page	Setup Item	F-SET	C-SET	ALL	PRSET	SCENE	REFER	LENS	STD	Power OFF
12	AUTO IRIS 2	IRIS WINDOW	1		◎	◎	×	◎	×	○	–
		IRIS WINDOW IND.	OFF		×	×	×	×	×	○	OFF
		IRIS LEVEL	0		◎	○	◎	○	×	○	–
		IRIS APL RATIO	0		◎	○	×	○	×	○	–
		IRIS VAR WIDTH	245		◎	◎	×	◎	×	○	–
		IRIS VAR HEIGHT	72		◎	◎	×	◎	×	○	–
		IRIS VAR H POS.	0		◎	◎	×	◎	×	○	–
		IRIS VAR V POS.	0		◎	◎	×	◎	×	○	–
		IRIS SPEED	2		◎	◎	×	◎	×	○	–
		CLIP HIGH LIGHT	OFF		◎	◎	×	◎	×	○	–
13	FUNCTION 3	TEST SAW SAW/REC	SAW		◎	◎	×	×	×	×	–
		WHT FILTER INH	OFF		◎	◎	×	×	×	×	–
		COLOR BAR SEL	EBU		◎	◎	×	×	×	×	–
		REC TALLY	UPPER		◎	◎	×	×	×	×	–
		COLOR VF INPUT	COMP		◎	◎	×	×	×	×	–
		USER & ALL ONLY	OFF		◎	◎	×	×	×	×	–
		RM COMMON MEMORY	OFF		◎	◎	×	×	×	×	–
		VTR START/STOP	RM		◎	◎	×	×	×	×	–
		EXT VTR REC CTL	OFF		◎	◎	×	×	×	×	–
		REC INH. WITH CCU	ON		◎	◎	×	×	×	×	–
14	GENLOCK	GENLOCK	ON		◎	◎	×	×	×	×	–
		RETURN VIDEO	OFF		◎	◎	×	×	×	×	–
		GL H PHASE	0		×	○	×	×	×	×	–
		GL SC PHASE	0		×	○	×	×	×	×	–
		GL SC 1/180 SEL	0		×	◎	×	×	×	×	–
15	ND COMP	ND OFFSET ADJUST	OFF		×	×	×	×	×	×	–
		CLEAR ND OFFSET	–		–	–	–	–	–	–	–
		ND ADJUST MODE	–		–	–	–	–	–	–	–
16	AUTO SHADING	AUTO BLK SHADING	OFF		–	–	–	–	–	–	–
		RESET BLK SHD	–		–	–	–	–	–	–	–
		TEST OUT SELECT	ENC		×	×	×	×	×	○	ENC
		MASTER GAIN(TMP)	Depends on the GAIN switch.		×	×	★	★	×	★	Depends on the GAIN switch.

4. FILE Menu

No.	Page	Setup Item	F-SET	C-SET	ALL	PRSET	SCENE	REFER	LENS	STD	Power OFF
01	USER FILE	USER FILE LOAD	–		–	–	–	–	–	–	–
		USER FILE SAVE	–		–	–	–	–	–	–	–
		F. ID	–		×	×	×	×	×	×	–
		USER PREST	–		–	–	–	–	–	–	–
02	USER FILE2	STORE USR PRESET	–		–	–	–	–	–	–	–
		CLEAR USR PRESET	–		–	–	–	–	–	–	–
		CUSTMIZE RESET	–		–	–	–	–	–	–	–
		LOAD CUSTOM DATA	OFF		◎	◎	×	×	×	×	–
		LOAD OUT OF USER	OFF		◎	◎	×	×	×	×	–
		BEFORE FILE PAGE	OFF		◎	◎	×	×	×	×	–
		USER LOAD WHITE	OFF		◎	◎	×	×	×	×	–
03	ALL FILE	ALL FILE LOAD	–		–	–	–	–	–	–	–
		ALL FILE SAVE	–		–	–	–	–	–	–	–
		F. ID	–		◎	×	×	×	×	×	–
		ALL PRESET	–		–	–	–	–	–	–	–
		STORE ALL PRESET	–		–	–	–	–	–	–	–
		CLEAR ALL PRESET	–		–	–	–	–	–	–	–
		3SEC CLR PRESET	OFF		×	×	×	×	×	○	OFF
04	SCENE FILE	1 to 5	–		–	–	–	–	–	–	–
		STANDARD	–		–	–	–	–	–	–	–
		SCENE RECALL	–		–	–	–	–	–	–	–
		SCENE STORE	–		–	–	–	–	–	–	–
		F.ID	–		×	×	×	×	×	×	–
05	REFERENCE	REFERENCE STORE	–		–	–	–	–	–	–	–
		REFERENCE CLEAR	–		–	–	–	–	–	–	–
		REFERENCE LOAD	–		–	–	–	–	–	–	–
		REFERENCE SAVE	–		–	–	–	–	–	–	–
		F. ID	–		×	×	×	×	×	×	–
		SCENE WHITE DATA	OFF		◎	◎	×	×	×	×	–
06	LENS FILE 1	LENS FILE RECALL	–		–	–	–	–	–	–	–
		LENS FILE STORE	–		–	–	–	–	–	–	–
		F.ID	–		×	×	×	×	◎	×	–
		LENS NO OFFSET	–		–	–	–	–	–	–	–
		SOURCE	MEMORY 1		–	–	–	–	–	–	–

No.	Page	Setup Item	F-SET	C-SET	ALL	PRSET	SCENE	REFER	LENS	STD	Power OFF
07	LENS FILE 2	LENS M VMOD	0		×	×	×	×	◎	×	–
		LENS CENTER H	0		×	×	×	×	◎	×	–
		LENS CENTER V	0		×	×	×	×	◎	×	–
		TEST OUT SELECT	ENC		×	×	×	×	×	○	ENC
		LENS R FLARE	0		×	×	×	×	◎	×	–
		LENS G FLARE	0		×	×	×	×	◎	×	–
		LENS B FLARE	0		×	×	×	×	◎	×	–
		LENS W-R OFST	0		×	×	×	×	◎	×	–
		LENS W-B OFST	0		×	×	×	×	◎	×	–
08	LENS FILE 3	SHADING CH SEL	R		×	×	×	×	×	○	R
		TEST OUT SELECT	ENC		×	×	×	×	×	○	ENC
		LENS R/G/B H SAW	0		×	×	×	×	◎	×	–
		LENS R/G/B H PARA	0		×	×	×	×	◎	×	–
		LENS R/G/B V SAW	0		×	×	×	×	◎	×	–
		LENS R/G/B V PARA	0		×	×	×	×	◎	×	–
09	MEMORY STICK	FORMAT	–		–	–	–	–	–	–	–
		MS IN > JUMP TO	OFF		◎	◎	×	×	×	×	–
10	TELE FILE	TELE FILE CLEAR	–		–	–	–	–	–	–	–
		ID	–		–	–	–	–	–	–	–
		SIZE	–		–	–	–	–	–	–	–
		REMAIN	–		–	–	–	–	–	–	–
		STATUS	–		–	–	–	–	–	–	–

5. DIAGNOSIS Menu

No.	Page	Setup Item	F-SET	C-SET	ALL	PRSET	SCENE	REFER	LENS	Power OFF
01	HOURS METER	RESET METER	–		–	–	–	–	–	–
		DRUM RUNNING	–		–	–	–	–	–	–
		TAPE RUNNING	–		–	–	–	–	–	–
		OPERATION	–		–	–	–	–	–	–
		THREADING	–		–	–	–	–	–	–
		DRUM RUNNING-2	–		–	–	–	–	–	–
		TAPE RUNNING-2	–		–	–	–	–	–	–
		OPERATION-2	–		–	–	–	–	–	–
		THREADING-2	–		–	–	–	–	–	–
02	TIME/DATE	ADJUST	–		–	–	–	–	–	–
		HOUR	–		–	–	–	–	–	–
		MIN	–		–	–	–	–	–	–
		SEC	–		–	–	–	–	–	–
		YEAR	–		–	–	–	–	–	–
		MONTH	–		–	–	–	–	–	–
		DAY	–		–	–	–	–	–	–
03	ROM VERSION	AT	–		–	–	–	–	–	–
		SS	–		–	–	–	–	–	–
		FP	–		–	–	–	–	–	–
		EQ	–		–	–	–	–	–	–
04	DEV STATUS	I/O	–		–	–	–	–	–	–
		IFA	–		–	–	–	–	–	–
		FP1	–		–	–	–	–	–	–
		FP2	–		–	–	–	–	–	–
		TG	–		–	–	–	–	–	–
		NVRAM	–		–	–	–	–	–	–
		AT	–		–	–	–	–	–	–
		EEPROM	–		–	–	–	–	–	–
		IFA	–		–	–	–	–	–	–
		DCP	–		–	–	–	–	–	–
		PS	–		–	–	–	–	–	–
		LSI	–		–	–	–	–	–	–
		PX	–		–	–	–	–	–	–
		BCS	–		–	–	–	–	–	–
		SCI	–		–	–	–	–	–	–
		SS	–		–	–	–	–	–	–
		RM	–		–	–	–	–	–	–
05	OPTION BOARD	PICTURE CACHE	–		–	–	–	–	–	–
		SDI OUTPUT	–		–	–	–	–	–	–
		COMPOSITE VIDEO INPUT	–		–	–	–	–	–	–

6. SERVICE Menu

No.	Page	Setup Item	F-SET	C-SET	ALL	PRSET	SCENE	REFER	LENS	STD	Power OFF
01	MENU SET	RE ROTATION REV	OFF		×	×	×	×	×	×	–
		RE SPEED	3		×	×	×	×	×	×	–
		DIRECT VALUE	OFF		×	×	×	×	×	○	OFF
02	SP FUNC	WIDE AWB	ON		×	×	×	×	×	×	–
		INDICATOR < : >	OFF		×	×	×	×	×	○	OFF
		IRIS GAIN	0		×	×	×	×	×	×	–
		ABB LEVEL ADJ.	OFF		×	×	×	×	×	×	–
		ABB TARGET LEVEL	3.0		×	×	×	×	×	×	–
03	VA ADJUST	PREKNEE ADJ MODE	OFF		×	×	×	×	×	○	OFF
		R PRE KNEE	0		×	×	×	×	×	×	–
		G PRE KNEE	0		×	×	×	×	×	×	–
		B PRE KNEE	0		×	×	×	×	×	×	–
		TESTOUT SELECT	ENC		×	×	×	×	×	○	ENC
		TEST SAW	OFF		◎	◎	×	×	×	○	–
		TEST SAW LEVEL	0		×	×	×	×	×	×	–
04	AD ADJUST	R AD LEVEL	0		×	×	×	×	×	×	–
		B AD LEVEL	0		×	×	×	×	×	×	–
		AD CLOCK PHASE	–		×	×	×	×	×	×	–
		R/B CLOCK PHASE	–		×	×	×	×	×	×	–
05	ENC ADJUST	INT FSC ADJ MODE	0		×	×	×	×	×	×	OFF
		INT FSC FREQ.	0		×	×	×	×	×	×	–
		Q FILTER*	WIDE		×	×	×	×	×	×	–
		V BLANKING WIDTH*	20H		×	×	×	×	×	×	–
06	CCD ADJUST	R VSUB	–		×	×	×	×	×	×	–
		G VSUB	–		×	×	×	×	×	×	–
		B VSUB	–		×	×	×	×	×	×	–
		R RG BIAS	–		×	×	×	×	×	×	–
		G RG BIAS	–		×	×	×	×	×	×	–
		B RG BIAS	–		×	×	×	×	×	×	–
		TEST OUT SELECT	ENC		×	×	×	×	×	○	ENC

*: It is displayed only when the Camcoder is set to be NTSC.

No.	Page	Setup Item	F-SET	C-SET	ALL	PRSET	SCENE	REFER	LENS	STD	Power OFF
07	VTR MODE-7	FAN MODE	AUTO		×	×	×	×	×	○	AUTO
08	MEASURE	MEASUREMENT MODE	OFF		×	×	×	×	×	○	OFF
		MASTER BLACK	0		◎	○	◎	○	×	○	REFER
		MASTER GAIN (TMP)	Depends on the GAIN switch.		×	×	★	★	×	★	Depends on the GAIN switch.
09	VTR MAINTE	C0 : SERVO CHECK	–		–	–	–	–	–	–	–
		C1 : RF CHECK	–		–	–	–	–	–	–	–
		A0 : SERVO ADJUST	–		–	–	–	–	–	–	–
		A1 : RF ADJUST	–		–	–	–	–	–	–	–
		A4 : MECHANISM ADJUST	–		–	–	–	–	–	–	–
		A9 : OTHERS ADJUST	–		–	–	–	–	–	–	–
10	FILTER CTEMP	FILTER CTEMP A	3200		×	×	×	×	×	×	–
		FILTER CTEMP B	3200		×	×	×	×	×	×	–
		FILTER CTEMP C	4300		×	×	×	×	×	×	–
		FILTER CTEMP D	6300		×	×	×	×	×	×	–
11	SHADING	AUTO WHT SHADING	OFF		–	–	–	–	–	–	–
		RESET WHT SHD	–		–	–	–	–	–	–	–
		TEST OUT SELECT	ENC		×	×	×	×	×	○	ENC
		2D BLK SHADING	ON		×	×	×	×	×	×	–

7. Others

For more detail, refer to “5-8. Special Saving Items”.

No.	Page	Setup Item	F-SET	C-SET	ALL	PRSET	SCENE	REFER	LENS	STD	Power OFF
–	–	WHITE R Gain	0		☆	×	☆	☆	×	☆	–
–	–	WHITE B Gain	0		☆	×	☆	☆	×	☆	–
–	–	MASTER GAIN	–		×	×	★	★	×	★	Depends on the GAIN switch.
–	–	SHUTTER	–		×	×	★	★	×	★	Depends on the SHUTTER switch.
–	–	DCC (Auto knee)	–		×	×	★	★	×	★	Depends on the DCC switch.
–	–	SHUTTER SEL	–		×	×	◎	◎	×	◎	–
–	–	SHUTTER ECS FREQ	60Hz		×	×	◎	◎	×	◎	–
–	–	ND FILTER POS	–		×	×	☆	×	×	×	–
–	–	CC FILTER POS	–		×	×	☆	×	×	×	–

Section 5
File System

5-1. Structure of File System

The MSW-900/900P can save data modifications made using the setup menu, as files in the main unit itself and in a memory stick. The file system consists of the USER file, PRESET USER file, ALL file, SCENE file, REFERENCE file and LENS file. For details of the respective files, refer to Section 4-10, "Setup Menu List".

USER file

The USER file contains data set using the USER menu. The data can also be saved in a memory stick. When this file is saved in a memory stick, the USER category can be set in the user preference setup immediately by reading USER file data from the memory stick next time.
The USER category itself can also be customized so that items can be added or deleted. Therefore, the USER file can be used as a SCENE file or an ALL file as appropriate.

PRESET USER file

The PRESET USER file stores the USER file as the standard setup.
The PRESET USER file cannot be saved in a memory stick.

ALL file

The ALL file contains the setups of all categories. The ALL file can be saved in a memory stick.
When the ALL file is saved in a memory stick after adjusting the first camera, the user can set the second and subsequent cameras to have the same adjustment setup as the first camera immediately by reading the ALL file data from a memory stick.

SCENE file

The SCENE file contains data that has been painted in accordance with the shooting scene. The SCENE file data is used together with the REFERENCE file data.
When an operator saves the setup data that is optimized for a specific scene during rehearsal, the operator can establish exactly the same setup for the actual take as in the rehearsal by calling the saved setup data.
Up to 5 SCENE files can be saved in the USER layer of the main unit and 100 SCENE files can be saved in a memory stick. (For details of the hierarchical layer structure, refer to Section 5-2, "Data Structure".)
The SCENE file data are maintained until the new data are set and stored.

REFERENCE file

The REFERENCE file contains the reference values of the auto setup adjustment. When the auto setup is executed, the values of the respective items are set to the values of the REFERENCE file data.
A single REFERENCE file can be saved in the PRESET layer of the PAINT category of main unit, and a single REFERENCE file can also be saved in a memory stick. (For details of the hierarchical layer structure, refer to Section 5-2, "Data Structure".)
If the REFERENCE file is not registered, the default setup data when shipped from the factory is used as the reference values.
The REFERENCE file data are maintained until the new data are set and stored.

LENS file

The LENS file contains data of unique characteristics (flare and white shading) for each lens.
Up to 5 LENS files can be saved in the USER layer of the main unit and 100 LENS files can be saved in a memory stick. (For details of the hierarchical layer structure, refer to Section 5-2, "Data Structure".)

5-2. Data Structure

The respective menu items can be classified into the categories of USER, OPERATION, PAINT and MAINTENANCE. In addition to these categories, the respective menu items have different data in the USER layer (it is not the USER category), PRESET layer, SERVICE layer and FACTORY layer.

USER layer :	Data that can be changed by menu operation. This layer is used mainly by users.
PRESET layer :	Data to be registered as the standard setup. This layer is mainly set up by video engineer.
SERVICE layer [*1] :	Data that can be changed by service engineer after entering the SERVICE mode. As it cannot be modified by the user and video engineer, this layer is identical to the default setup when shipped from the factory for the user and video engineer.
FACTORY layer :	Factory-adjusted values and fixed values.

*1 : To change data in the SERVICE layer, be sure to set the switch S1-1 on the AT-143 board to ON.

Category Data structure	USER	OPERATION	PAINT	MAINTENANCE	FILE	SERVICE
USER layer						
PRESET layer						
SERVICE layer						
FACTORY layer						

ALL

The menu has the basic data structure as follows.

Actual setup data = FACTORY layer data (absolute value) + SERVICE layer data (relative value) + PRESET layer data (relative value) + USER layer data (relative value)

Note that some menu items (such as switch data and KNEE POINT data) do not have data in the FACTORY layer and SERVICE layer. Such menu items have the basic data structure as follows.

Actual setup data = USER layer data (absolute value)

Registering the standard setup means transferring the setup data that is available as of this timing, to the PRESET layer. In other words, when the standard setup is registered, the PRESET layer value and the USER layer value are added so that the sum of the PRESET layer value and the USER layer value becomes the new PRESET layer data while clearing the USER layer data.
Calling the standard setup means clearing the USER layer data.
When the standard setup is returned to the default setup (that is set when shipped from the factory), the PRESET layer data and the USER layer data are cleared.

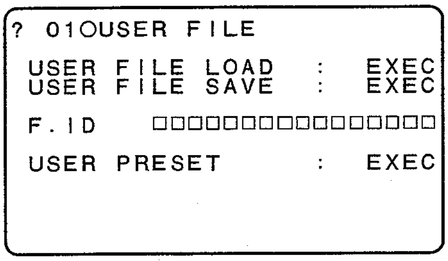
5-3. Operating the USER File

Calling the Standard Setup

Category / Data structure	USER
USER layer	↑
PRESET layer	
SERVICE layer	

USER PRESET

1. Set the MENU ON/OFF switch to the ON position.
2. Let the USER FILE display of the FILE menu appear on the screen and press the rotary encoder.



```
? 01OUSER FILE

 USER FILE LOAD    :    EXEC
 USER FILE SAVE    :    EXEC

 F.ID    □□□□□□□□□□□□□□□□

 USER PRESET       :    EXEC
```

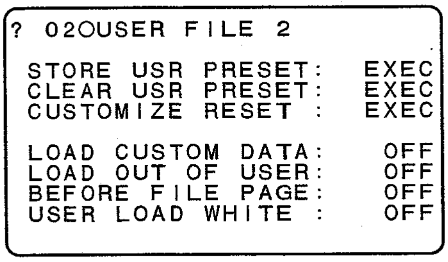
3. Select USER PRESET and execute it by pressing the rotary encoder.

Modifying and Registering the Standard Setup

Category / Data structure	USER
USER layer	↓
PRESET layer	
SERVICE layer	

STORE USER PRESET

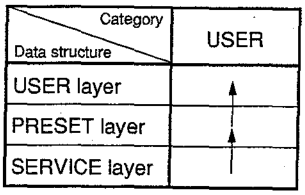
1. Set the MENU ON/OFF switch to the ON position.
2. Create the standard setup of your preference by setting the items on each page of the USER menu. (Refer to Section 4 “Setup Menu”.)
3. Let the USER FILE 2 display of the FILE menu appear on the screen and press the rotary encoder.



```
? 02OUSER FILE 2

 STORE USR PRESET:   EXEC
 CLEAR USR PRESET:   EXEC
 CUSTOMIZE RESET :   EXEC

 LOAD CUSTOM DATA:    OFF
 LOAD OUT OF USER:    OFF
 BEFORE FILE PAGE:    OFF
 USER LOAD WHITE :    OFF
```

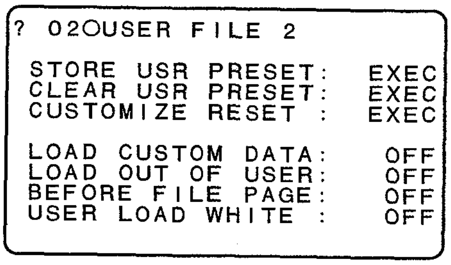
4. Select STORE USR PRESET and execute it by pressing the rotary encoder.

Resetting the Standard Setup to the Default Setup When Shipped from the Factory


Category
Data structure
USER
USER layer
PRESET layer
SERVICE layer

CLEAR USER PRESET

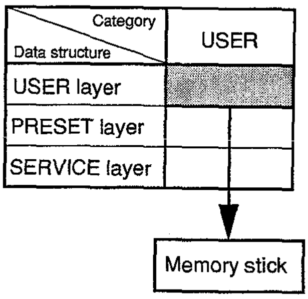
1. Set the MENU ON/OFF switch to the ON position.
2. Let the USER FILE 2 display of the FILE menu appear on the screen and press the rotary encoder.



```
? 020USER FILE 2

  STORE USR PRESET:   EXEC
  CLEAR USR PRESET:   EXEC
  CUSTOMIZE RESET  :  EXEC

  LOAD CUSTOM DATA:    OFF
  LOAD OUT OF USER:    OFF
  BEFORE FILE PAGE:    OFF
  USER LOAD WHITE  :   OFF
```

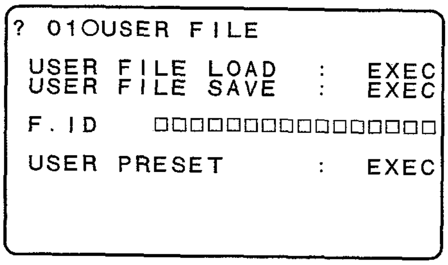
3. Select CLEAR USR PRESET and execute it by pressing the rotary encoder.

Saving the Setup Contents to a Memory Stick


Category
Data structure
USER
USER layer
PRESET layer
SERVICE layer
Memory stick

USER FILE SAVE

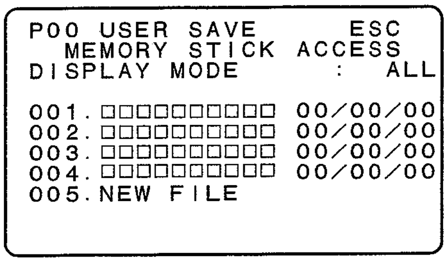
1. Insert a memory stick.
2. Set the MENU ON/OFF switch to the ON position.
3. Let the USER FILE display of the FILE menu appear on the screen and press the rotary encoder.



```
? 010USER FILE

  USER FILE LOAD   :   EXEC
  USER FILE SAVE   :   EXEC

  F.ID    □□□□□□□□□□□□□□□□

  USER PRESET      :   EXEC
```

4. Select F.ID and set the file ID.
5. Select USER FILE SAVE and execute it by pressing the rotary encoder.

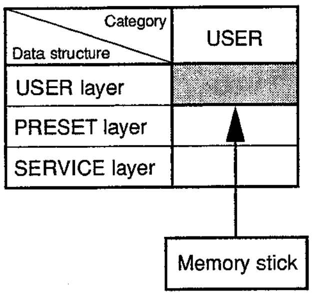
6. When the cursor is moved to the file selection display, select the destination file where the file is going to be saved and press the rotary encoder. (When saving a new file, select NEW FILE.)



```
P00 USER SAVE          ESC
  MEMORY STICK ACCESS
DISPLAY MODE       :   ALL

001.□□□□□□□□□□ 00/00/00
002.□□□□□□□□□□ 00/00/00
003.□□□□□□□□□□ 00/00/00
004.□□□□□□□□□□ 00/00/00
005.NEW FILE
```

7. Confirm that the screen returns to the USER FILE display and the message [COMPLETE!] appears indicating that the saving is complete.

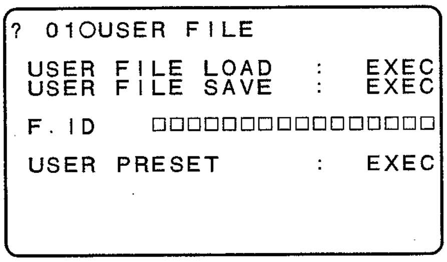
Reading the Saved File from a Memory Stick



Category / Data structure	USER
USER layer	▨
PRESET layer	
SERVICE layer	

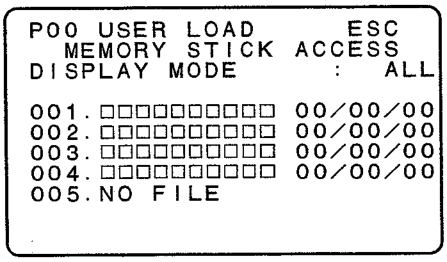
USER FILE LOAD

1. Insert a memory stick.
2. Set the MENU ON/OFF switch to the ON position.
3. Let the USER FILE display of the FILE menu appear on the screen and press the rotary encoder.



```
? 01OUSER FILE

 USER FILE LOAD    :   EXEC
 USER FILE SAVE    :   EXEC

 F.ID    □□□□□□□□□□□□□□□□

 USER PRESET       :   EXEC
```

4. Select USER FILE LOAD and press the rotary encoder.
5. When the cursor is moved to the file selection display, select the desired file that you want to read and press the rotary encoder.



```
P00 USER LOAD          ESC
  MEMORY STICK ACCESS
DISPLAY MODE       :   ALL

001.□□□□□□□□□□ 00/00/00
002.□□□□□□□□□□ 00/00/00
003.□□□□□□□□□□ 00/00/00
004.□□□□□□□□□□ 00/00/00
005.NO FILE
```

6. Confirm that the screen returns to the USER FILE display and the message [COMPLETE!] appears indicating that the reading is complete.

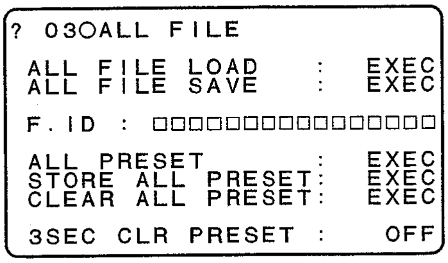
5-4. Operating the ALL File

Calling the Standard Setup

Category / Data structure	USER	OPERATION	PAINT	MAINTE NANCE	FILE	MENU CUSTOMIZE
USER layer	↑	↑	↑	↑	↑	↑
PRESET layer	│	│	│	│	│	│
SERVICE layer						

ALL PRESET

1. Set the MENU ON/OFF switch to the ON position.
2. Let the ALL FILE display of the FILE menu appear on the screen and press the rotary encoder.



```
? 03OALL FILE
 ALL FILE LOAD    :  EXEC
 ALL FILE SAVE    :  EXEC
 F.ID : □□□□□□□□□□□□□□□□
 ALL PRESET       :  EXEC
 STORE ALL PRESET :  EXEC
 CLEAR ALL PRESET :  EXEC
 3SEC CLR PRESET  :   OFF
```

3. Select ALL PRESET and execute it by pressing the rotary encoder.

Modifying and Registering the Standard Setup

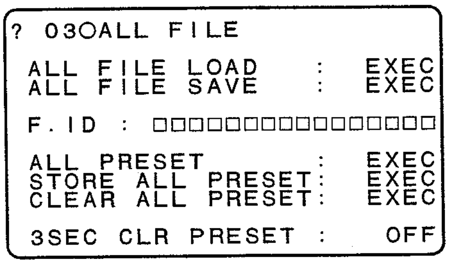
Category / Data structure	USER	OPERATION	PAINT	MAINTE NANCE	FILE	MENU CUSTOMIZE
USER layer	│	│	│	│	│	│
PRESET layer	↓	↓	↓	↓	↓	↓
SERVICE layer						

STORE ALL PRESET

Note

Before starting to create the standard setup of your preference, be sure to execute the first topic "Calling the standard setup (ALL PRESET)". If any other setup item is modified accidentally from the standard setup, and if ALL PRESET is not executed, the modified setup is set as the standard setup when the STORE ALL PRESET is executed.

1. Perform the steps 1 through 3 of "Calling the standard setup" as described above.
2. Create the standard setup of your preference by setting the items on each page of the USER menu. (Refer to Section 4 "Setup Menu".)
3. Let the ALL FILE display of the FILE menu appear on the screen and press the rotary encoder.



```
? 03OALL FILE
 ALL FILE LOAD    :  EXEC
 ALL FILE SAVE    :  EXEC
 F.ID : □□□□□□□□□□□□□□□□
 ALL PRESET       :  EXEC
 STORE ALL PRESET :  EXEC
 CLEAR ALL PRESET :  EXEC
 3SEC CLR PRESET  :   OFF
```

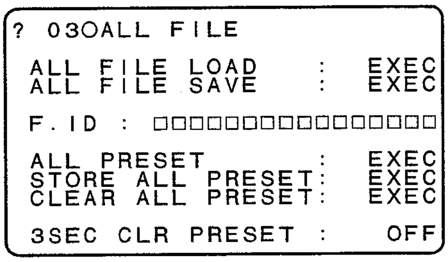
4. Select STORE ALL PRESET and execute it by pressing the rotary encoder.

Resetting the Standard Setup to the Default Setup when Shipped from the Factory

Category / Data structure	USER	OPERATION	PAINT	MAINTE NANCE	FILE	MENU CUSTOMIZE
USER layer	↑	↑	↑	↑	↑	↑
PRESET layer	↑	↑	↑	↑	↑	↑
SERVICE layer	│	│	│	│	│	│

CLEAR ALL PRESET

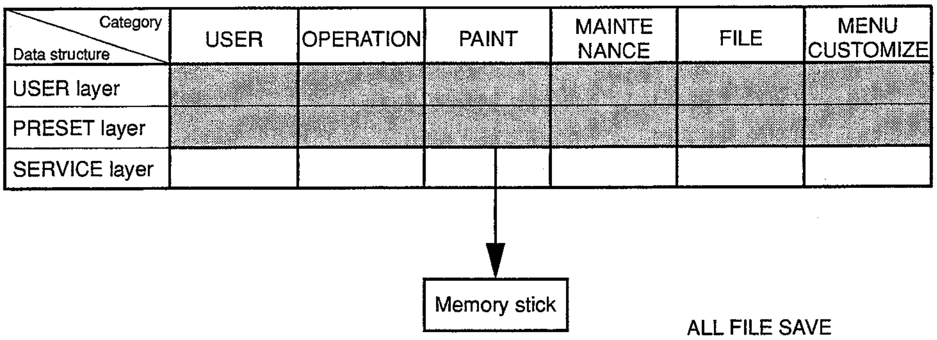
1. Set the MENU ON/OFF switch to the ON position.
2. Let the ALL FILE display of the FILE menu appear on the screen and press the rotary encoder.



```
? 03OALL FILE
 ALL FILE LOAD      :   EXEC
 ALL FILE SAVE      :   EXEC

 F.ID : □□□□□□□□□□□□□□□□

 ALL PRESET         :   EXEC
 STORE ALL PRESET:      EXEC
 CLEAR ALL PRESET:      EXEC

 3SEC CLR PRESET :       OFF
```

3. Select CLEAR ALL PRESET and execute it by pressing the rotary encoder.

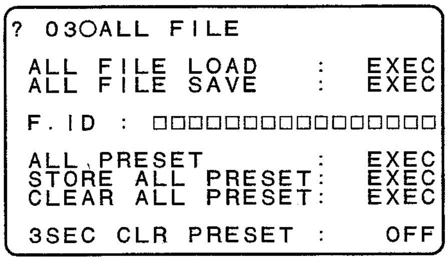
Saving the Setup Contents to a Memory Stick



Data structure \ Category	USER	OPERATION	PAINT	MAINTE NANCE	FILE	MENU CUSTOMIZE
USER layer	▨	▨	▨	▨	▨	▨
PRESET layer	▨	▨	▨	▨	▨	▨
SERVICE layer						

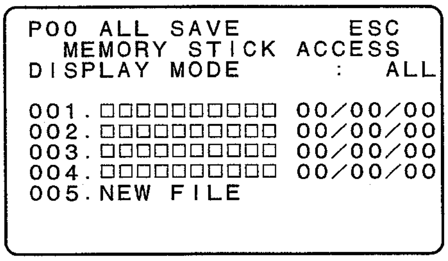
ALL FILE SAVE

1. Insert a memory stick.
2. Set the MENU ON/OFF switch to the ON position.
3. Let the ALL FILE display of the FILE menu appear on the screen and press the rotary encoder.



```
? 030ALL FILE

 ALL FILE LOAD    :  EXEC
 ALL FILE SAVE    :  EXEC

 F.ID : □□□□□□□□□□□□□□□□

 ALL PRESET       :  EXEC
 STORE ALL PRESET:   EXEC
 CLEAR ALL PRESET:   EXEC

 3SEC CLR PRESET :    OFF
```

4. Select F.ID and set the file ID.
5. Select ALL FILE SAVE and execute it by pressing the rotary encoder.
6. When the cursor is moved to the file selection display, select the destination file where the file is going to be saved and press the rotary encoder. (When saving a new file, select NEW FILE.)



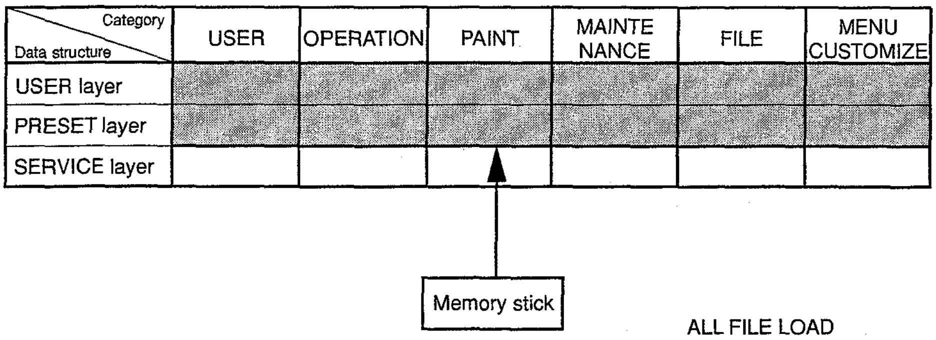
```
P00 ALL SAVE         ESC
   MEMORY STICK ACCESS
DISPLAY MODE       :  ALL

001.□□□□□□□□□□ 00/00/00
002.□□□□□□□□□□ 00/00/00
003.□□□□□□□□□□ 00/00/00
004.□□□□□□□□□□ 00/00/00
005.NEW FILE
```

7. Confirm that the screen returns to the ALL FILE display and the message [COMPLETE!] appears indicating that the saving is complete.

Note

When the user sets the desired standard setup by adjusting the first MSW-900/900P (to be executed up to STORE ALL PRESET), and the data is saved in a memory stick by the ALL FILE SAVE, the user can set the second and subsequent cameras to have the same adjustment setup as the first camera immediately by reading the ALL file data from a memory stick.

Reading the Saved File from a Memory Stick



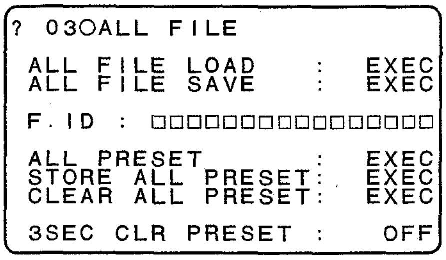
Category / Data structure	USER	OPERATION	PAINT	MAINTE NANCE	FILE	MENU CUSTOMIZE
USER layer	▨	▨	▨	▨	▨	▨
PRESET layer	▨	▨	▨	▨	▨	▨
SERVICE layer						

ALL FILE LOAD

Note

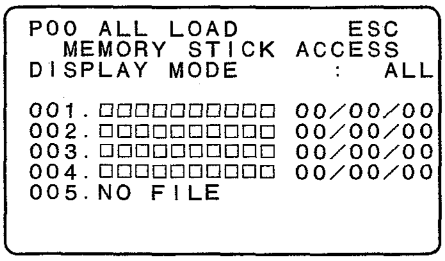
The ALL FILE LOAD reads the standard setup and saves in the main unit. If it reads the ALL file that contains the modified standard setup data, the standard setup will be modified.

1. Insert a memory stick.
2. Set the MENU ON/OFF switch to the ON position.
3. Let the ALL FILE display of the FILE menu appear on the screen and press the rotary encoder.



```
? 03OALL FILE

 ALL FILE LOAD     :    EXEC
 ALL FILE SAVE     :    EXEC

 F.ID : □□□□□□□□□□□□□□□□

 ALL PRESET        :    EXEC
 STORE ALL PRESET:      EXEC
 CLEAR ALL PRESET:      EXEC

 3SEC CLR PRESET   :     OFF
```

4. Select ALL FILE LOAD and press the rotary encoder.
5. When the cursor is moved to the file selection display, select the desired file that you want to read and press the rotary encoder.



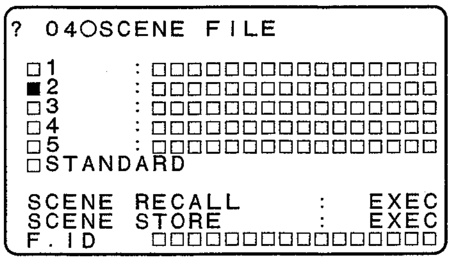
```
P00 ALL LOAD          ESC
  MEMORY STICK ACCESS
DISPLAY MODE        :  ALL

001.□□□□□□□□□□ 00/00/00
002.□□□□□□□□□□ 00/00/00
003.□□□□□□□□□□ 00/00/00
004.□□□□□□□□□□ 00/00/00
005.NO FILE
```

6. Confirm that the screen returns to the ALL FILE display and the message [COMPLETE!] appears indicating that the reading is complete.

5-5. Operating the SCENE File

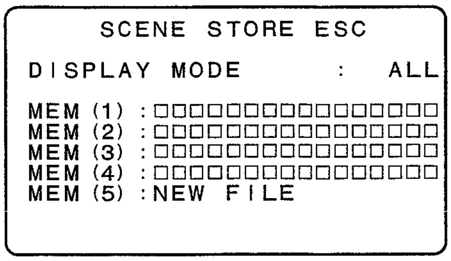
Saving in the Main Unit

1. Set the MENU ON/OFF switch to the ON position.
2. Create the optimum scene data by painting and other adjustments using the setup menu.
   (For details of the respective file items of the SCENE file, refer to Section 4-10, "Setup Menu List".)
3. Let the SCENE FILE display of the FILE menu appear on the screen and select F.ID to set the file ID.



```
? 04○SCENE FILE

 □1      :□□□□□□□□□□□□□□□□
 ■2      :□□□□□□□□□□□□□□□□
 □3      :□□□□□□□□□□□□□□□□
 □4      :□□□□□□□□□□□□□□□□
 □5      :□□□□□□□□□□□□□□□□
 □STANDARD

 SCENE RECALL      :   EXEC
 SCENE STORE       :   EXEC
 F.ID     □□□□□□□□□□□□□□□□
```

4. Select SCENE STORE and execute it by pressing the rotary encoder.
5. When the cursor is moved to the file selection display, select the destination file where the file is going to be saved and press the rotary encoder. (When saving a new file, select NEW FILE.)

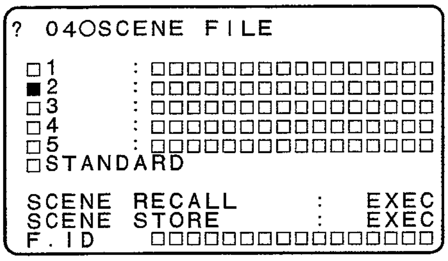


```
      SCENE STORE ESC

 DISPLAY MODE       :   ALL

 MEM (1) :□□□□□□□□□□□□□□□□
 MEM (2) :□□□□□□□□□□□□□□□□
 MEM (3) :□□□□□□□□□□□□□□□□
 MEM (4) :□□□□□□□□□□□□□□□□
 MEM (5) :NEW FILE
```

6. Confirm that the screen returns to the SCENE FILE display and the message [COMPLETE!] appears indicating that the saving is complete.

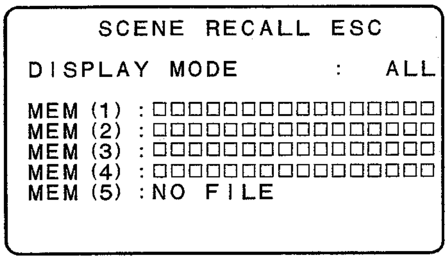
Calling from the Main Unit

1. Set the MENU ON/OFF switch to the ON position.
2. Let the SCENE FILE display of the FILE menu appear on the screen and press the rotary encoder.



```
? 04OSCENE FILE
 □1        : □□□□□□□□□□□□□□□□
 ■2        : □□□□□□□□□□□□□□□□
 □3        : □□□□□□□□□□□□□□□□
 □4        : □□□□□□□□□□□□□□□□
 □5        : □□□□□□□□□□□□□□□□
 □STANDARD
 SCENE RECALL     :    EXEC
 SCENE STORE      :    EXEC
 F.ID        □□□□□□□□□□□□□□□□
```

3. Select the SCENE RECALL and press the rotary encoder.
4. When the cursor is moved to the file selection display, select the file that you want to call and press the rotary encoder.

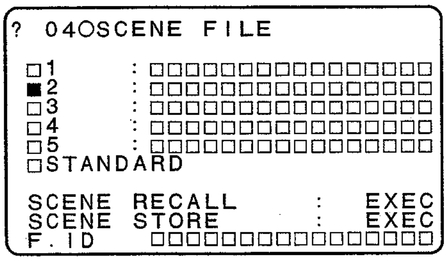


```
      SCENE RECALL ESC
 DISPLAY MODE        :  ALL
 MEM (1) :□□□□□□□□□□□□□□□□
 MEM (2) :□□□□□□□□□□□□□□□□
 MEM (3) :□□□□□□□□□□□□□□□□
 MEM (4) :□□□□□□□□□□□□□□□□
 MEM (5) :NO FILE
```

Note

To call the SCENE FILE using the SCENE RECALL/CANCEL function of the SCENE FILE display, follow the steps as shown below.

1. Set the MENU ON/OFF switch to the ON position.
2. Let the SCENE FILE display of the FILE menu appear on the screen and press the rotary encoder.

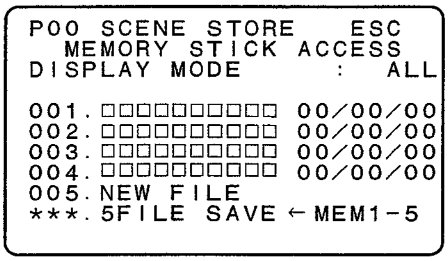


```
? 04OSCENE FILE
 □1        : □□□□□□□□□□□□□□□□
 ■2        : □□□□□□□□□□□□□□□□
 □3        : □□□□□□□□□□□□□□□□
 □4        : □□□□□□□□□□□□□□□□
 □5        : □□□□□□□□□□□□□□□□
 □STANDARD
 SCENE RECALL     :    EXEC
 SCENE STORE      :    EXEC
 F.ID        □□□□□□□□□□□□□□□□
```

3. Select the desired file from the files 1 through 5.
4. Press the rotary encoder to change the "□" display to "■".
   (When the rotary encoder is pressed while "■" is being displayed, calling the file is canceled and the display returns to the original display before calling.)

Saving in a Memory Stick

1. Insert a memory stick and perform the steps 1 to 5 of "Saving in the Main Unit" as described above. When you want to save data in the five memory sticks at the same time, select 5 FILE SAVE and press the rotary encoder.

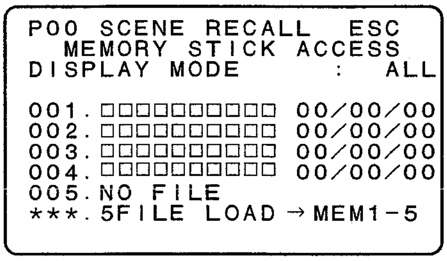


```
P00 SCENE STORE    ESC
  MEMORY STICK ACCESS
DISPLAY MODE      :  ALL

001.□□□□□□□□□□ 00/00/00
002.□□□□□□□□□□ 00/00/00
003.□□□□□□□□□□ 00/00/00
004.□□□□□□□□□□ 00/00/00
005.NEW FILE
***.5FILE SAVE ← MEM1-5
```

2. Confirm that the screen returns to the SCENE FILE display and the message [COMPLETE!] appears indicating that the saving is complete.

Reading the Saved Data from a Memory Stick

1. Insert a memory stick.
2. Perform the steps 1 to 4 of "Calling from the Main Unit" as described above. When you want to call data from the five memory sticks at the same time, select 5 FILE LOAD and press the rotary encoder.

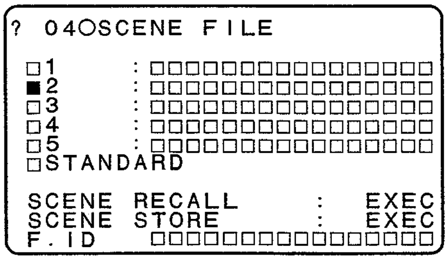


```
P00 SCENE RECALL   ESC
  MEMORY STICK ACCESS
DISPLAY MODE      :  ALL

001.□□□□□□□□□□ 00/00/00
002.□□□□□□□□□□ 00/00/00
003.□□□□□□□□□□ 00/00/00
004.□□□□□□□□□□ 00/00/00
005.NO FILE
***.5FILE LOAD → MEM1-5
```

3. Confirm that the screen returns to the SCENE FILE display and the message [COMPLETE!] appears indicating that the reading is complete.

Returning to the Standard Setup

1. Set the MENU ON/OFF switch to the ON position.
2. Let the SCENE FILE display of the FILE menu appear on the screen and press the rotary encoder.



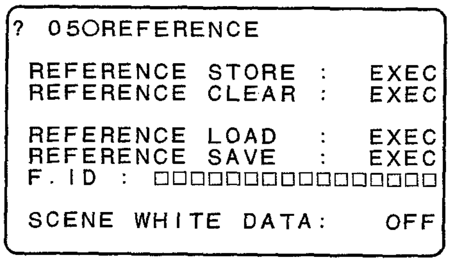
```
? 04OSCENE FILE

□1     :□□□□□□□□□□□□□□□□
■2     :□□□□□□□□□□□□□□□□
□3     :□□□□□□□□□□□□□□□□
□4     :□□□□□□□□□□□□□□□□
□5     :□□□□□□□□□□□□□□□□
□STANDARD

SCENE RECALL     :  EXEC
SCENE STORE      :  EXEC
F.ID   □□□□□□□□□□□□□□□□
```

3. Select STANDARD. Press the rotary encoder to change the " □ " display to " ■ ". (When the rotary encoder is pressed while " ■ " is being displayed, calling the file is canceled and the display returns to the original display before calling.)

5-6. Operating the REFERENCE File

Saving in the Main Unit

1. Set the MENU ON/OFF switch to the ON position.
2. Create the optimum reference file data by various adjustments using the setup menu.
   (For details of the respective file items of the REFERENCE file, refer to Section 4-10, "Setup Menu List".)
3. Let the REFERENCE display of the FILE menu appear on the screen and select F.ID to set the file ID.

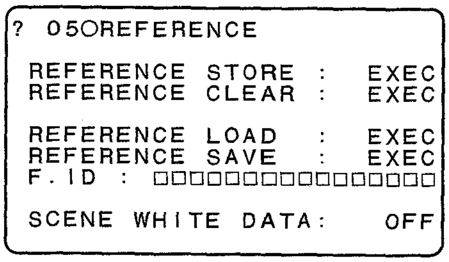


```
? 05OREFERENCE
 REFERENCE STORE :   EXEC
 REFERENCE CLEAR :   EXEC

 REFERENCE LOAD  :   EXEC
 REFERENCE SAVE  :   EXEC
 F.ID : □□□□□□□□□□□□□□□□

 SCENE WHITE DATA:    OFF
```

4. Select REFERENCE STORE and execute it by pressing the rotary encoder.
5. A message appears prompting your confirmation. Select YES and press the rotary encoder.

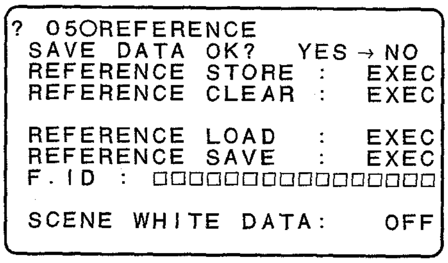
Saving in a Memory Stick

1. Insert a memory stick
2. Set the MENU ON/OFF switch to the ON position.
3. Let the REFERENCE display of the FILE menu appear on the screen and select F.ID to set the file ID.



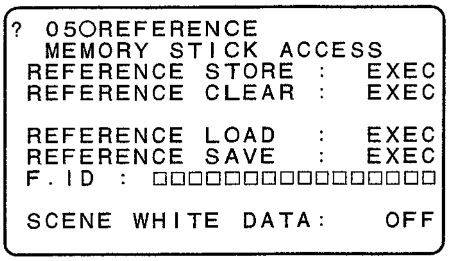
```
? 05OREFERENCE
 REFERENCE STORE :   EXEC
 REFERENCE CLEAR :   EXEC

 REFERENCE LOAD  :   EXEC
 REFERENCE SAVE  :   EXEC
 F.ID : □□□□□□□□□□□□□□□□

 SCENE WHITE DATA:    OFF
```

4. Select REFERENCE SAVE and press the rotary encoder. The message [SAVE DATA OK?] appears.



```
? 05OREFERENCE
 SAVE DATA OK?   YES → NO
 REFERENCE STORE :   EXEC
 REFERENCE CLEAR :   EXEC

 REFERENCE LOAD  :   EXEC
 REFERENCE SAVE  :   EXEC
 F.ID : □□□□□□□□□□□□□□□□

 SCENE WHITE DATA:    OFF
```

5. Select YES and press the rotary encoder. The message [MEMORY STICK ACCESS] appears.



```
? 05OREFERENCE
  MEMORY STICK ACCESS
 REFERENCE STORE :   EXEC
 REFERENCE CLEAR :   EXEC

 REFERENCE LOAD  :   EXEC
 REFERENCE SAVE  :   EXEC
 F.ID : □□□□□□□□□□□□□□□□

 SCENE WHITE DATA:    OFF
```

Note

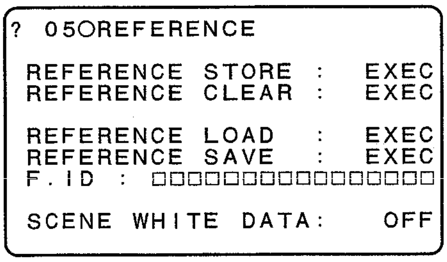
The following messages appear depending on the conditions.

- When a memory stick is not inserted : NO MEMORY STICK!
- When a memory stick is write-protected : MEMORY STICK LOCKED

6. Confirm that the message [COMPLETE!] appears indicating that the reading is complete.

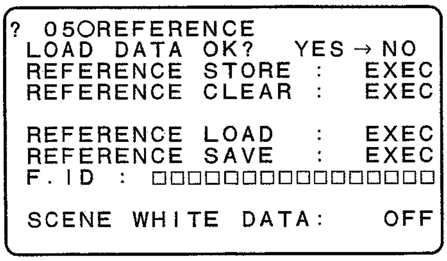
Reading the Saved File from a Memory Stick

1. Insert a memory stick.
2. Set the MENU ON/OFF switch to the ON position.
3. Let the REFERENCE display of the FILE menu appear on the screen.



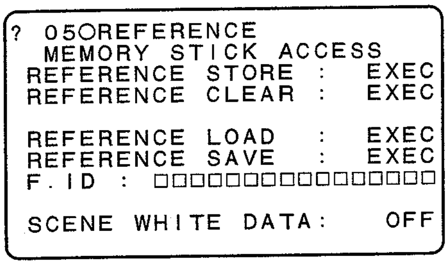
```
? 05OREFERENCE

 REFERENCE STORE :   EXEC
 REFERENCE CLEAR :   EXEC

 REFERENCE LOAD  :   EXEC
 REFERENCE SAVE  :   EXEC
 F.ID : □□□□□□□□□□□□□□□□

 SCENE WHITE DATA:    OFF
```

4. Select REFERENCE LOAD and press the rotary encoder. The message [LOAD DATA OK?] appears.



```
? 05OREFERENCE
 LOAD DATA OK?   YES → NO
 REFERENCE STORE :   EXEC
 REFERENCE CLEAR :   EXEC

 REFERENCE LOAD  :   EXEC
 REFERENCE SAVE  :   EXEC
 F.ID : □□□□□□□□□□□□□□□□

 SCENE WHITE DATA:    OFF
```

5. Select YES and press the rotary encoder. The message [MEMORY STICK ACCESS] appears.



```
? 05OREFERENCE
  MEMORY STICK ACCESS
 REFERENCE STORE :   EXEC
 REFERENCE CLEAR :   EXEC

 REFERENCE LOAD  :   EXEC
 REFERENCE SAVE  :   EXEC
 F.ID : □□□□□□□□□□□□□□□□

 SCENE WHITE DATA:    OFF
```

Note

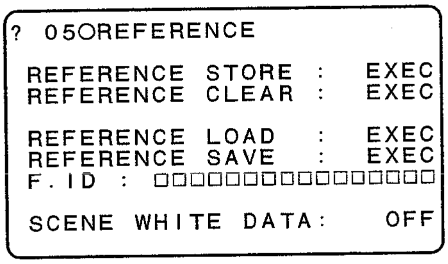
The following messages appear depending on the conditions.

- When a memory stick is not inserted :NO MEMORY STICK!
- When an error occurs : FILE ERROR

6. Confirm that the message [COMPLETE!] appears indicating that the reading is complete.

Resetting to the Default Setup When Shipped from Factory

1. Set the MENU ON/OFF switch to the ON position.
2. Let the REFERENCE display of the FILE menu appear on the screen. Select REFERENCE CLEAR and press the rotary encoder.



```
? 05OREFERENCE

 REFERENCE STORE :   EXEC
 REFERENCE CLEAR :   EXEC

 REFERENCE LOAD  :   EXEC
 REFERENCE SAVE  :   EXEC
 F.ID : □□□□□□□□□□□□□□□□

 SCENE WHITE DATA:    OFF
```

3. A message appears prompting your confirmation. Select YES and press the rotary encoder.

5-7. Operating the LENS File

Saving in the Main Unit

1. Set the MENU ON/OFF switch to the ON position.
2. Create the optimum lens file data by performing the various adjustments using the setup menu. (For details of the respective file items of the LENS file, refer to Section 4-10, "Setup Menu List".)
3. Let the LENS FILE 1 display of the FILE menu appear on the screen and select F.ID to set the file ID.

```
? 06OLENS FILE 1

 LENS FILE RECALL:   EXEC
 LENS FILE STORE :   EXEC

 F.ID : □□□□□□□□□□□□□□□□


 LENS NO OFFSET  :   EXEC

 SOURCE : MEMORY 1
```

4. Select LENS FILE STORE and execute it by pressing the rotary encoder.
5. When the cursor is moved to the file selection display, select the destination file where the file is going to be saved and press the rotary encoder. (When saving a new file, select NEW FILE.)

```
        LENS STORE ESC

 DISPLAY MODE          :  ALL

 MEM (1) :□□□□□□□□□□□□□□□□
 MEM (2) :□□□□□□□□□□□□□□□□
 MEM (3) :□□□□□□□□□□□□□□□□
 MEM (4) :□□□□□□□□□□□□□□□□
 MEM (5) :NEW FILE
```

Calling from the Main Unit

1. Set the MENU ON/OFF switch to the ON position.
2. Let the LENS FILE 1 display of the FILE menu appear on the screen. Select LENS FILE RECALL and press the rotary encoder.

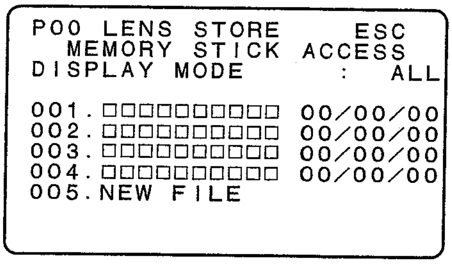
```
? 06OLENS FILE 1

 LENS FILE RECALL:   EXEC
 LENS FILE STORE :   EXEC

 F.ID : □□□□□□□□□□□□□□□□


 LENS NO OFFSET  :   EXEC

 SOURCE : MEMORY 1
```

3. When the cursor is moved to the file selection display, select the file that you want to call and press the rotary encoder.

```
        LENS RECALL ESC

 DISPLAY MODE          :  ALL

 MEM (1) :□□□□□□□□□□□□□□□□
 MEM (2) :□□□□□□□□□□□□□□□□
 MEM (3) :□□□□□□□□□□□□□□□□
 MEM (4) :□□□□□□□□□□□□□□□□
 MEM (5) :NO FILE
```

Saving in a Memory Stick

1. Insert a memory stick and perform the steps 1 to 5 of "Saving in the Main Unit" as described above.

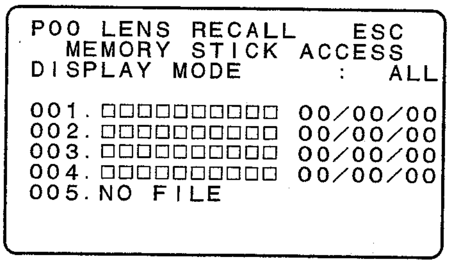


```
P00 LENS STORE      ESC
   MEMORY STICK ACCESS
DISPLAY MODE       :  ALL

001.□□□□□□□□□□ 00/00/00
002.□□□□□□□□□□ 00/00/00
003.□□□□□□□□□□ 00/00/00
004.□□□□□□□□□□ 00/00/00
005.NEW FILE
```

2. Confirm that the screen returns to the LENS FILE 1 display and the message [COMPLETE!] appears indicating that the saving is complete.

Reading the Saved File from a Memory Stick

1. Insert a memory stick. Perform the steps 1 to 3 of "Calling from the Main Unit" as described above.

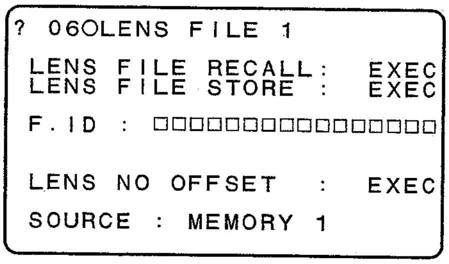


```
P00 LENS RECALL     ESC
   MEMORY STICK ACCESS
DISPLAY MODE       :  ALL

001.□□□□□□□□□□ 00/00/00
002.□□□□□□□□□□ 00/00/00
003.□□□□□□□□□□ 00/00/00
004.□□□□□□□□□□ 00/00/00
005.NO FILE
```

2. Confirm that the screen returns to the LENS FILE 1 display and the message [COMPLETE!] appears indicating that the reading is complete.

Returning to the Standard Setup

1. Set the MENU ON/OFF switch to the ON position.
2. Let the LENS FILE 1 display of the FILE menu appear on the screen. Select LENS NO OFFFSET and press the rotary encoder.



```
? 060LENS FILE 1

 LENS FILE RECALL:  EXEC
 LENS FILE STORE :  EXEC

 F.ID : □□□□□□□□□□□□□□□□


 LENS NO OFFSET  :  EXEC

 SOURCE : MEMORY 1
```

3. Confirm that the message [NO OFFFSET] appears indicating that the LENS FILE 1 returns to the standard setup.

5-8. Special Saving Items

5-8-1. White Gain

Using the REFERENCE file

Executing item	Status after execution
REFERENCE STORE ([REFERENCE] display)	The white gain values during execution are saved. (When the WHITE BAL switch is in A, the value of A is saved. When it is in B, the value of B is stored. When it is in PRST, the value of PRST is stored.) The white gain value that is assigned by the [PRESET WHT] display with the WHITE BAL switch being set in PRST, is saved.
REFERENCE CLEAR ([REFERENCE] display)	Both R/B GAIN values are set to 0 (3200K).
PRESET of the setup value ([PRESET WHT] display)	The value returns to the REFERENCE file value.

Using the SCENE file

- When "SCENE WHITE DATA" is set to ON using the [REFERENCE] display

Executing item	Status after execution
SCENE STORE ([SCENE FILE] display)	The white gain values during execution are saved. (When the WHITE BAL switch is in A, the value of A is saved. When it is in B, the value of B is stored. When it is in PRST, the value of PRST is stored.) The white gain value that is assigned by the [PRESET WHT] display with the WHITE BAL switch being set in PRST, is saved.
SCENE RECALL ([SCENE FILE] display)	The white gain values during execution are replaced by the SCENE file values. However, when "RECALL" is executed with the WHITE BAL switch being in the PRST position, the values are not replaced.
SCENE STANDARD ([SCENE FILE] display)	The white gain values during execution become the REFERENCE file values.

- When "SCENE WHITE DATA" is set to OFF using the [REFERENCE] display

Executing item	Status after execution
SCENE STORE ([SCENE FILE] display)	The white gain values during execution are not saved.
SCENE RECALL ([SCENE FILE] display)	The white gain values are not rewritten.
SCENE STANDARD/CANCEL ([SCENE FILE] display)	The PRESET value and the white gain values during execution are not replaced.

- When some models set "SCENE WHITE DATA" to ON, some models set "SCENE WHITE DATA" to OFF and these models are existing at the same time:
  The white gain values are not read in the following both cases: when the SCENE file in which the white gain value is not saved is read with "SCENE WHITE DATA" being ON, or when the SCENE file in which the white gain value is saved is read with "SCENE WHITE DATA" being OFF. If "SCENE STORE" is executed under this conditions, the white balance values are not saved so that the white balance information is lost.

5-8-2. CC/ND Filter

The filter position of the CC and ND filters can be saved in the REFERENCE file and in the SCENE file.
When the motor-powered filter is attached optionally, the filter is electrically controlled to set the filter in the specified position when the filter position data is read from the file.
When the motor-powered filter is not attached, the filter position data is read and saved as an information but the filter is not controlled.

5-8-3. Master Gain

The Master Gain value can be saved in the REFERENCE file and in the SCENE file.
When the MSW-900 is used as the standalone machine, the Master Gain value is not used to control the MSW-900 and the present value is maintained even though the Master Gain value is read from the files. (The Master Gain value is determined by the hardware switch.)
When the MSW-900 is connected to the MSU, the MSW-900 is controlled by the Master Gain value that is read from the file.

5-8-4. Shutter

The SHUTTER ON/OFF data, ECS frequency data and SHUTTER SEL value can be saved in the REFERENCE file and in the SCENE file.
The ECS frequency data and SHUTTER SEL value are controlled by the setup data that are read from the files, but the SHUTTER ON/OFF is determined by the hardware switch, when the MSW-900 is used as the standalone machine. (When the MSW-900 is connected to the RM/MSU, the above values and the SHUTTER ON/OFF are both controlled by the file data.)

Section 6
Parts Replacement

6-1. CCD Unit and Its Components Parts Replacement Procedure

6-1-1. CCD Unit Replacement

Overview

Removing the front assembly
Removing the filter knob
Removing the CCD unit
Installing the CCD unit
Installing the filter knob
Attaching the front assembly

Adjustment after Replacement

VCO CONT frequency adjustment

Removal

1. Removing the front assembly

(1) Remove the outside panel assembly. (Refer to Section 1-4.)

(2) Open the inside panel assembly. (Refer to Section 1-5.)

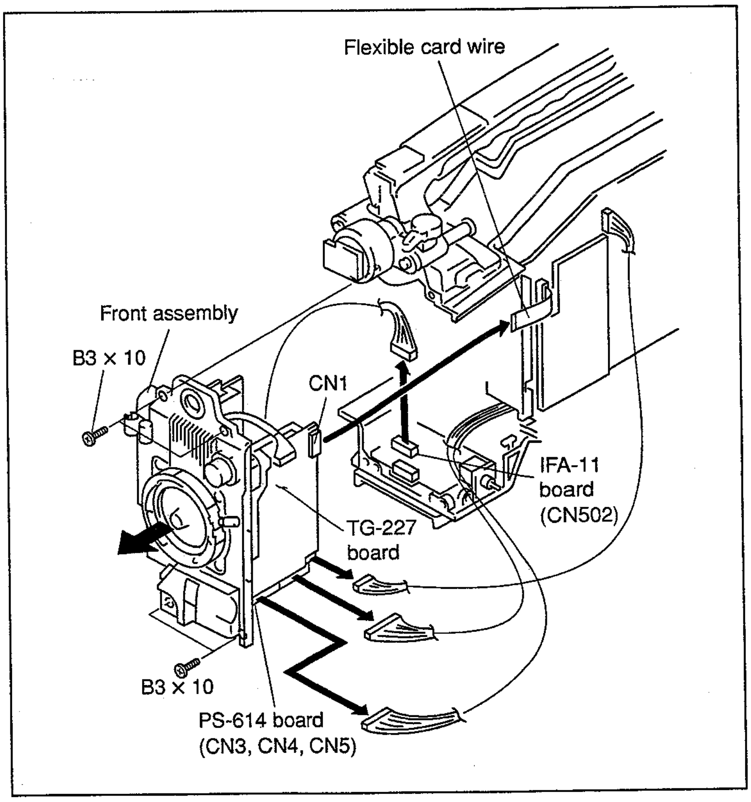
(3) Disconnect the flexible card wire from the connector (CN1) on the TG-227 board.

Note

Life of flexible card wire will be significantly shortened if it is folded. Be very careful not to fold the flexible card wire.

(4) Disconnect the harnesses from the connectors (CN3, CN4, CN5) on the PS-614 board.

(5) Remove the four screws. While removing the front assembly, disconnect harness from the connector (CN502) on the IFA-11 board.

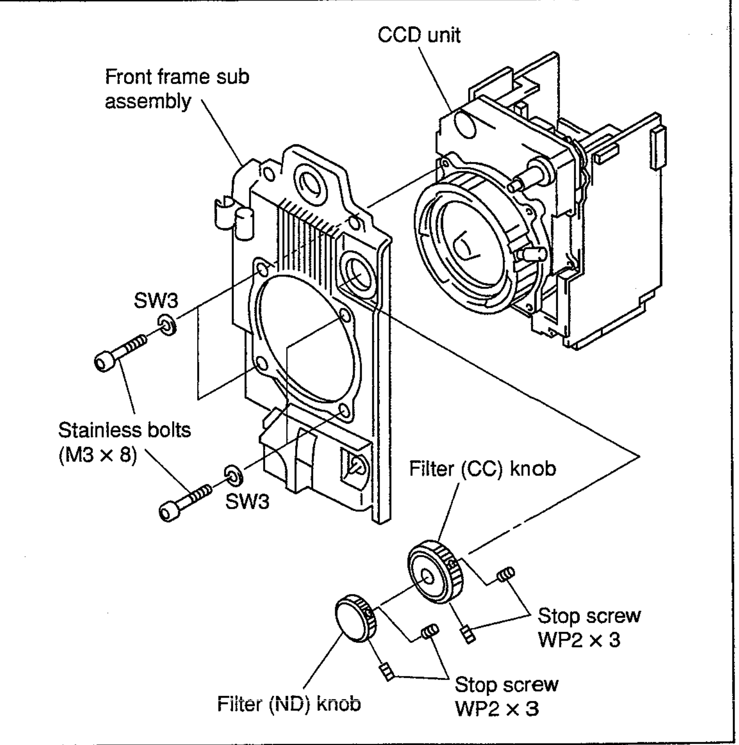

Flexible card wire
Front assembly
B3 x 10
CN1
IFA-11 board (CN502)
TG-227 board
B3 x 10
PS-614 board (CN3, CN4, CN5)

2. Removing the filter knob

(1) Loosen the two set screws, and remove the filter (ND) knob.
(2) Loosen the two set screws, and remove the filter (CC) knob.
Tool : L shaped hex wrench (d = 0.89 mm)

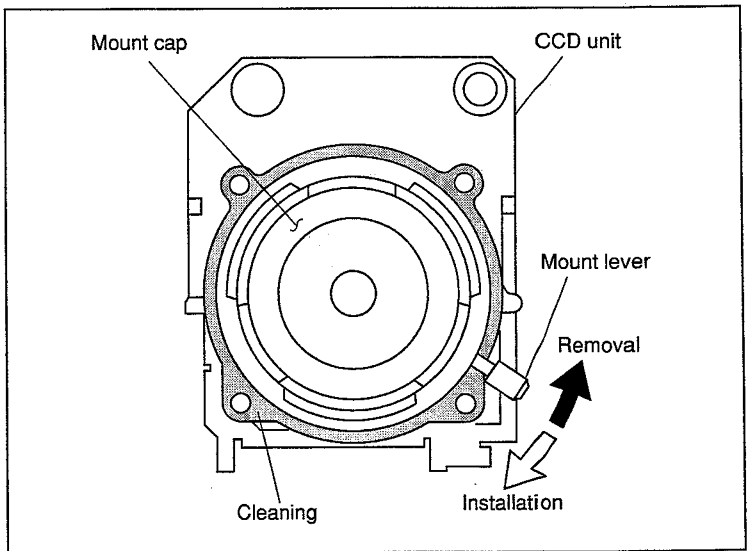
3. Removing the CCD unit

Remove the four stainless bolts (M3 × 8) and the four washers (SW3). Then remove the CCD unit from the front frame sub assembly.
Tool : L shaped hex wrench (d = 2.5 mm)


CCD unit
Front frame sub assembly
SW3
Stainless bolts (M3 x 8)
SW3
Filter (CC) knob
Stop screw WP2 x 3
Stop screw WP2 x 3
Filter (ND) knob

4. Installing the CCD unit

(1) Clean the areas (the shaded portion ▨ shown in illustration) that are contacting with the front frame as shown in the illustration.
(2) Install the CCD unit to the front frame sub assembly with the four stainless bolts (M3 × 8) and the four washers (SW3).
Standard tightening torque :
110×10^{-2} N•m (11 kgf•cm)


Mount cap
CCD unit
Mount lever
Removal
Cleaning
Installation

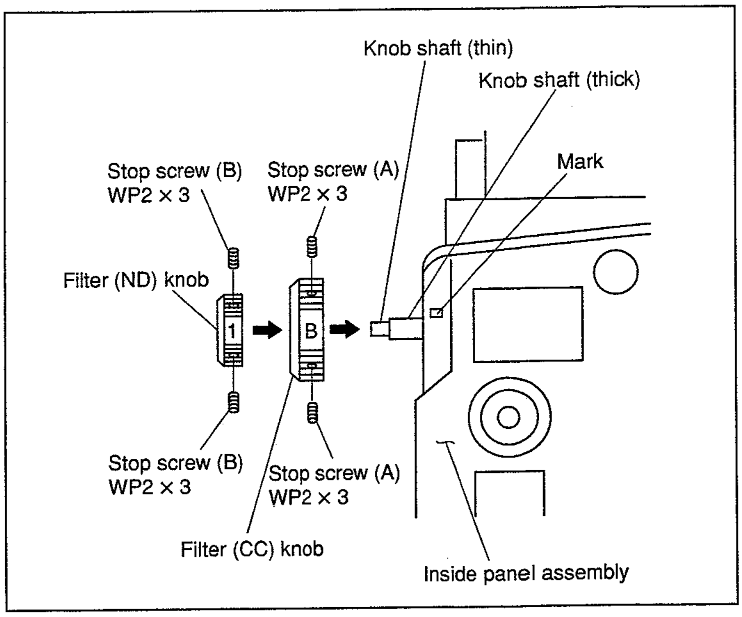
5. Installing the filter knob

(1) Rotate the knob shaft (thick) until the filter of the thinnest color is visible from the front.

(2) Align the filter (CC) knob number "B" with the mark on the inside panel assembly and attach it with the use of the two set screws (A).

(3) Rotate the knob shaft (thin) until the filter of the thinnest color is visible from the front.

(4) Align the filter (ND) knob number "1" with the mark on the inside panel assembly and attach it with the use of the two set screws (B).
Standard tightening torque :
20 to 25 × 10^{-2} N•m (2 to 2.5 kgf•cm)


Knob shaft (thin)
Knob shaft (thick)
Mark
Stop screw (B) WP2 × 3
Stop screw (A) WP2 × 3
Filter (ND) knob
1
B
Stop screw (B) WP2 × 3
Stop screw (A) WP2 × 3
Filter (CC) knob
Inside panel assembly

6. Attaching the front assembly

(1) Connect securely the harnesses that are removed in steps (4) and (5) of removal procedure, to the IFA-11 board (CN502) and PS-614 board (CN3, CN4, CN5). Connect securely the flexible card wire that is removed in step (3) of removal procedure, to TG-227 board (CN1).

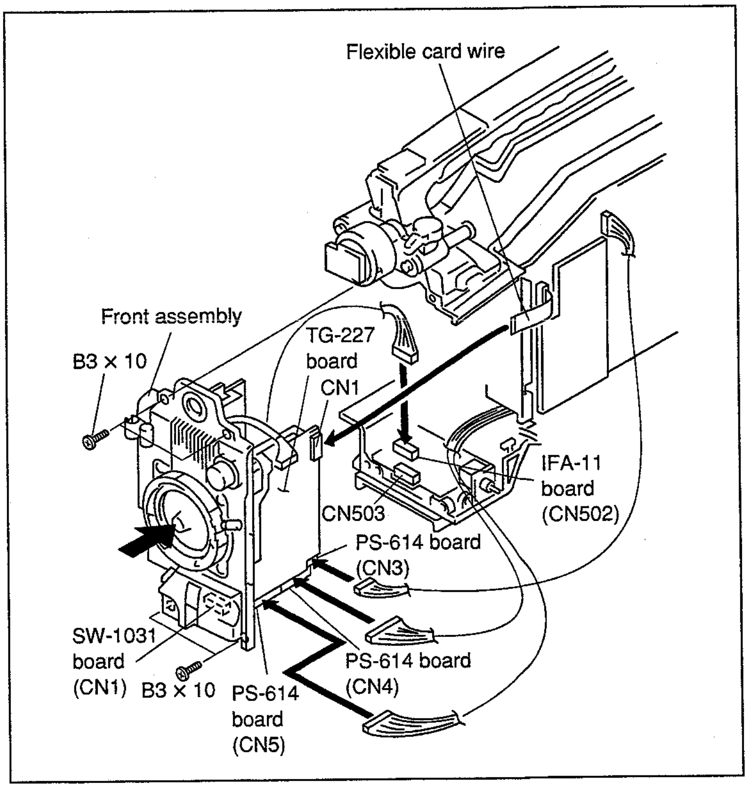
Note

Life of flexible card wire will be significantly shortened if it is folded. Be very careful not to fold the flexible card wire.

(2) Attach the front assembly with the four screws.
Standard tightening torque :
80 × 10^{-2} N•m (8 kgf•cm)

Note

When the front assembly is attached, coupling between the connectors CN503 on the IFA-11 board and CN1 on the SW-1031 is engaged at the same time. Therefore, do not apply an excessive force


Flexible card wire
Front assembly
B3 × 10
TG-227 board
CN1
IFA-11 board (CN502)
CN503
PS-614 board (CN3)
SW-1031 board (CN1)
B3 × 10
PS-614 board (CN5)
PS-614 board (CN4)

(3) Closing the inside panel assembly
(Refer to Section 1-5.)

(4) Reinstalling the outside panel assembly.
(Refer to Section 1-4.)

Adjustment after Replacement

7. VCO CONT frequency check

(Refer to Section 9-2.)

6-2. Replacement of the Circuit Boards inside the CCD Unit

Note

Order of steps of replacement is shown by the numbers in the illustration.

1. Remove the outside panel assembly. (Refer to Section 1-4.)

2. Open the inside panel assembly. (Refer to Section 1-5.)

3. Remove the front assembly. (Refer to Section 6-1-1.)

4. Removing the TG-227 board

(1) Remove the connector (CN3) on the TG-227 board.

(2) Remove the three screws (M2 × 5) from the TG-227 board. Loosen and then remove the connection of the TG-227 board from CN2 on the PS-614 board. Remove the flexible card wires from the connectors (CN200, CN201, CN202) on the TG-227 board.

Notes

- Life of flexible card wire will be significantly shortened if it is folded. Be very careful not to fold the flexible card wire.
- To disconnect the TG-227 board from the connector CN2 on the PS-614 board, pull the connector straight out gently. If the connector is disconnected with extra force, the solder portion of the connector can be cracked.

5. Removing the VA-208 board

Remove the three screws (M2 × 5) from the VA-208 board. Loosen and then remove the connection of the VA-208 board from CN1 on the PS-614 board. Remove the connectors (CN1, CN3, CN4) on the VA-208 board.

Note

To disconnect the TG-227 board from the connector CN1 on the PS-614 board, pull the connector straight out gently. If the connector is disconnected with extra force, the solder portion of the connector can be cracked.

6. Removing the PS-614 board

Remove the four screws (M2 × 5) and remove the PS-614 board.

7. Removing the SE-641 board

(1) Remove the four screws (P2 × 4) and remove the CHB stay.

(2) Remove the two screws (P2 × 4) and remove the two washers (W2) and two filter ID plates.

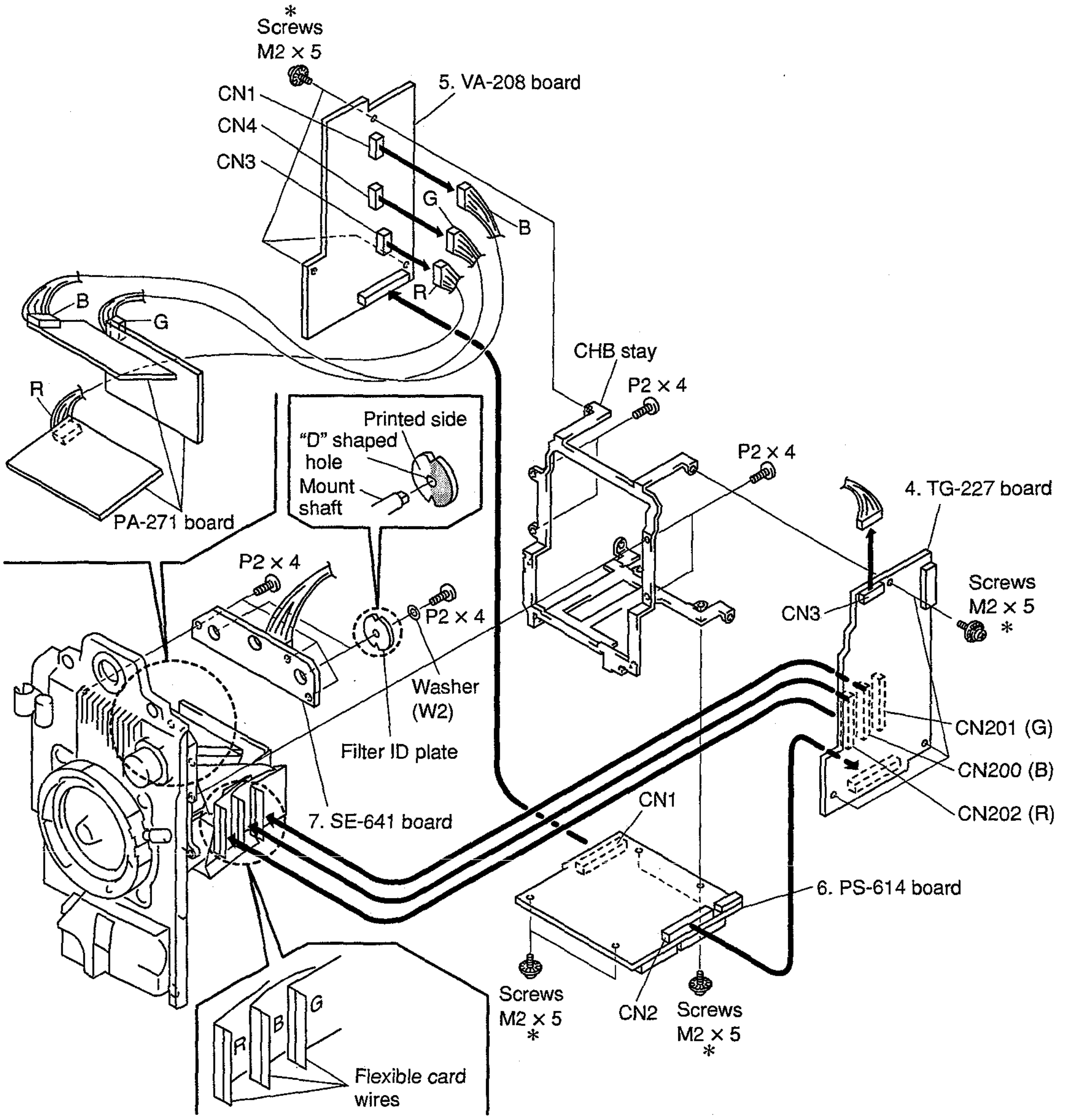
(3) Remove the three screws (P2 × 4) and remove the SE-641 board.

8. Attaching

Attach the boards by reversing the step 1 to 7.

Notes

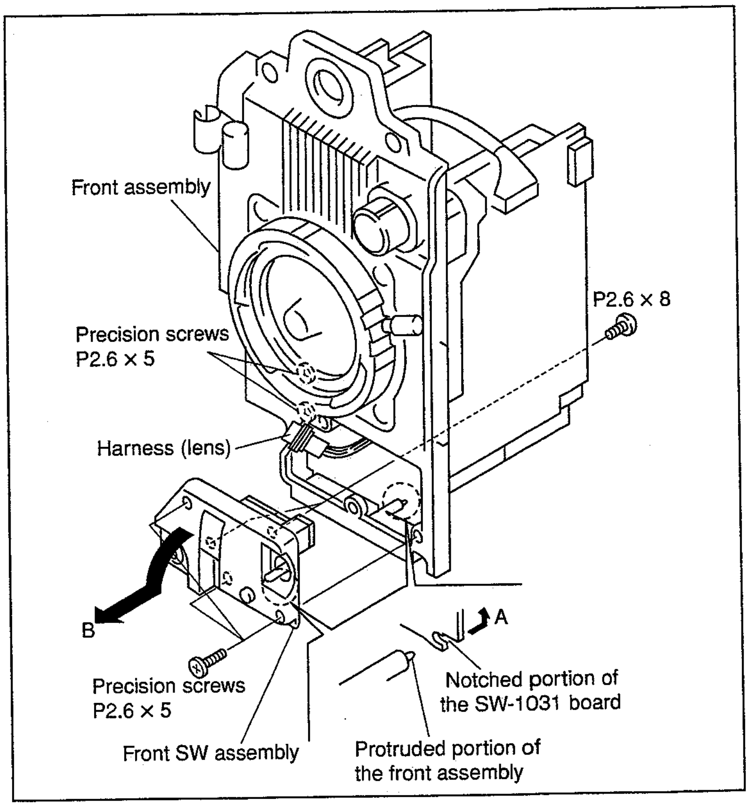
- When installing the filter ID plate, place the filter ID plate so that the printed side faces toward the SE-641 board and its "D" shaped hole is aligned with the mount shaft.
- When installing the harness to the VA-208 board, do not make any mistake in the B, G, R positions of the PA-271 board.
- When installing the flexible card wires to the TG-227 board, align the R, B, G marks that are printed on the flexible card wires with the R, B, G marks that are printed on the side A of the TG-227 board.


Screws
M2 × 5
*
5. VA-208 board
CN1
CN4
CN3
G
B
R
B
G
R
PA-271 board
CHB stay
P2 × 4
P2 × 4
Printed side
"D" shaped hole
Mount shaft
P2 × 4
P2 × 4
Washer (W2)
Filter ID plate
7. SE-641 board
4. TG-227 board
Screws
M2 × 5
*
CN3
CN201 (G)
CN200 (B)
CN202 (R)
CN1
6. PS-614 board
Screws
M2 × 5
*
CN2
Screws
M2 × 5
*
R
B
G
Flexible card wires

* : Serial No. 40001 to 40128 : Precision screws P1.4 × 3.5

6-3. Shutter, AUTO W/B BAL Switch and AUDIO Volume Controls Replacement

1. Remove the front assembly.
   (Refer to Section 6-1-1.)
2. Loosen the two screws securing the lens connector.
3. Remove the two screws (P2.6 × 8) fixing the SW-1031 board. Then remove the three precision screws (P2.6 × 5) fixing the front SW cover assembly.
4. Remove the notched portion of the SW-1031 board from the protrusion of the front assembly in the direction of arrow A. Then remove the front SW cover assembly in the direction of arrow B.

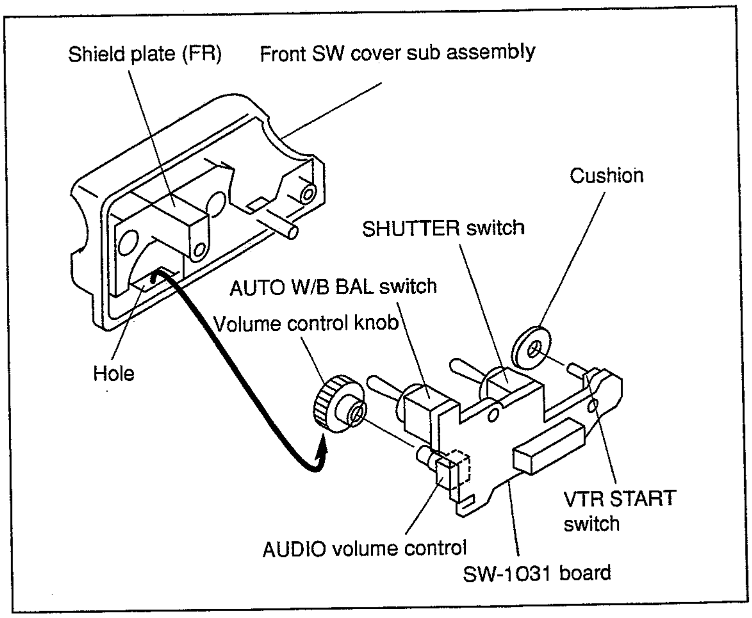

Front assembly
P2.6 × 8
Precision screws
P2.6 × 5
Harness (lens)
A
B
Precision screws
P2.6 × 5
Notched portion of the SW-1031 board
Front SW assembly
Protruded portion of the front assembly

5. Remove the SW-1031 board in the manner of removing the volume control knob through the hole of the front SW cover sub assembly.

   Note

   The Cushion is supplied with the VTR START switch. Do not lose the Cushion. Note that the Cushion is not used in the machines of serial No. 40001 to No. 40128.

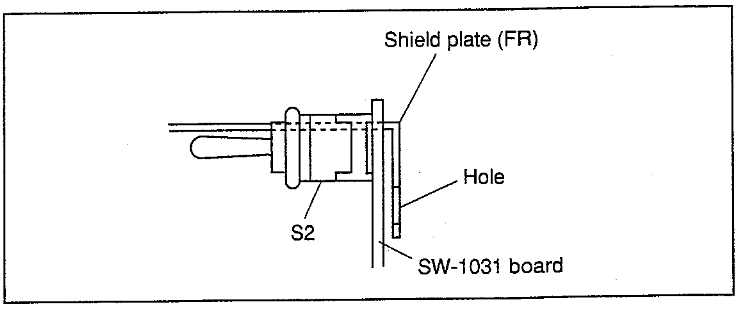
6. Remove soldering from the SHUTTER switch, AUTO W/B BAL switch and AUDIO volume control and remove them from the SW-1031 board.


Shield plate (FR)
Front SW cover sub assembly
Cushion
SHUTTER switch
AUTO W/B BAL switch
Volume control knob
Hole
VTR START switch
AUDIO volume control
SW-1031 board

7. Install the new SHUTTER switch, AUTO W/B BAL switch and AUDIO volume controls by reversing the steps of removal.

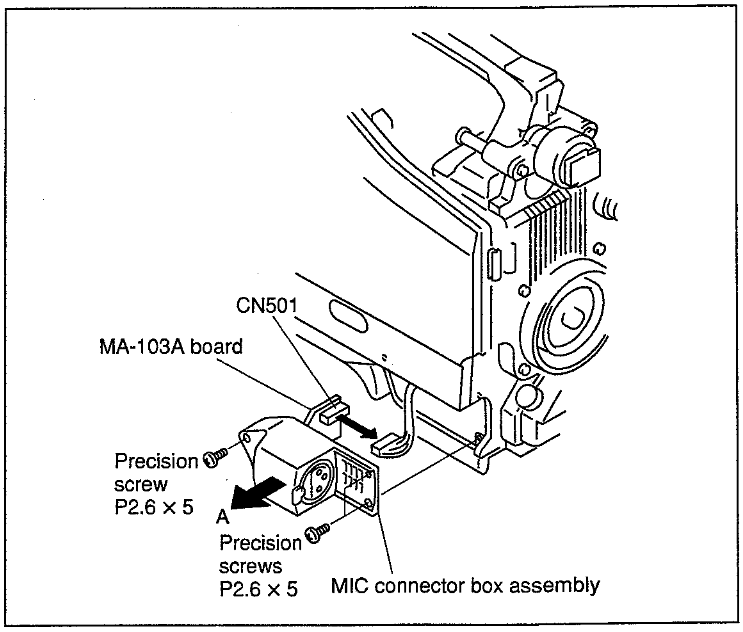
Note

When installing the SW-1031 board, be careful that the hole of the shield plate (FR) is located on the rear of the SW-1031 board.

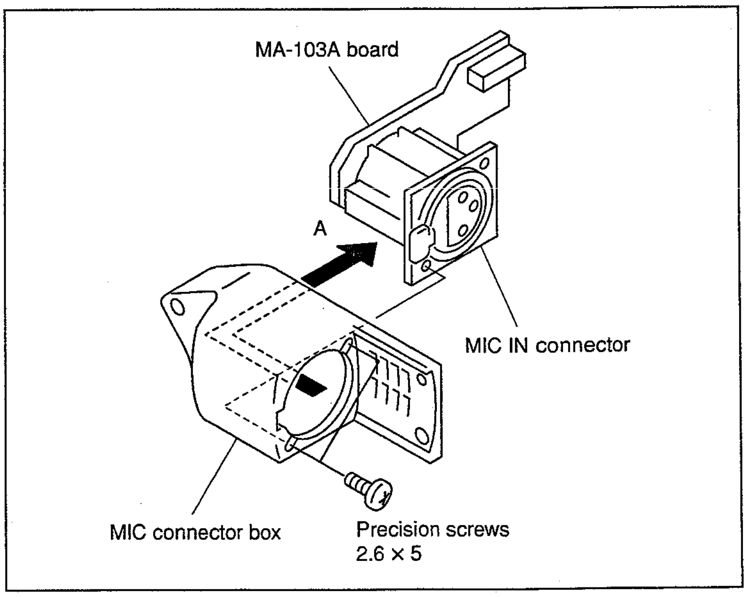

Shield plate (FR)
Hole
S2
SW-1031 board

6-4. MIC IN Connector Replacement

1. Remove the three precision screws. While removing the MIC connector box assembly in the direction of arrow A, disconnect the harness from the connector (CN501) on the MA-103A board.


CN501
MA-103A board
Precision screw P2.6 x 5
A
Precision screws P2.6 x 5
MIC connector box assembly

2. Remove the two precision screws and remove the MA-103A board from the MIC connector box in the direction of arrow A.
3. Remove the soldering and remove the MIC IN connector from the MA-103A board.


MA-103A board
A
MIC IN connector
MIC connector box
Precision screws 2.6 x 5

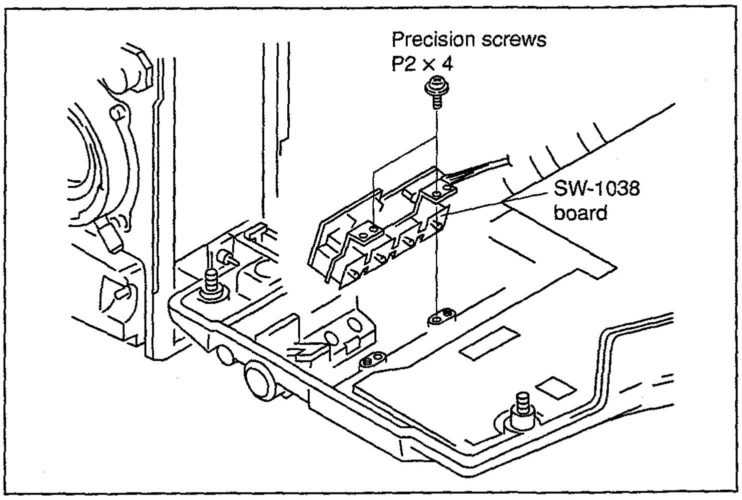
4. Install the new MIC IN connector by reversing the steps of removal.

   Note

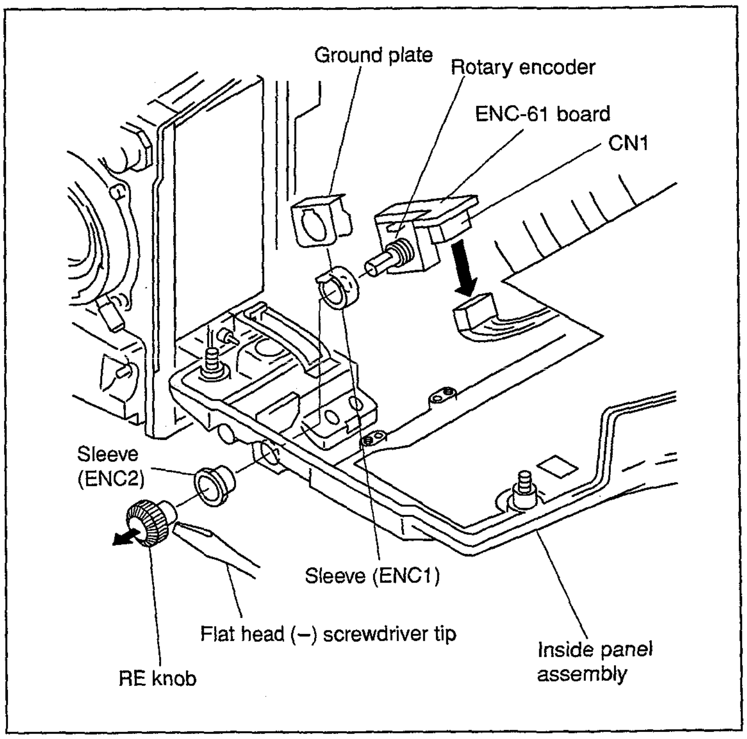
   When installing the MIC connector box assembly to the main unit, be careful not to damage the harness.

6-5. Rotary Encoder Replacement

1. Open the inside panel assembly.
   (Refer to Section 1-5.)
2. Remove the two screws and remove the SW-1038 board.


Precision screws
P2 x 4
SW-1038
board

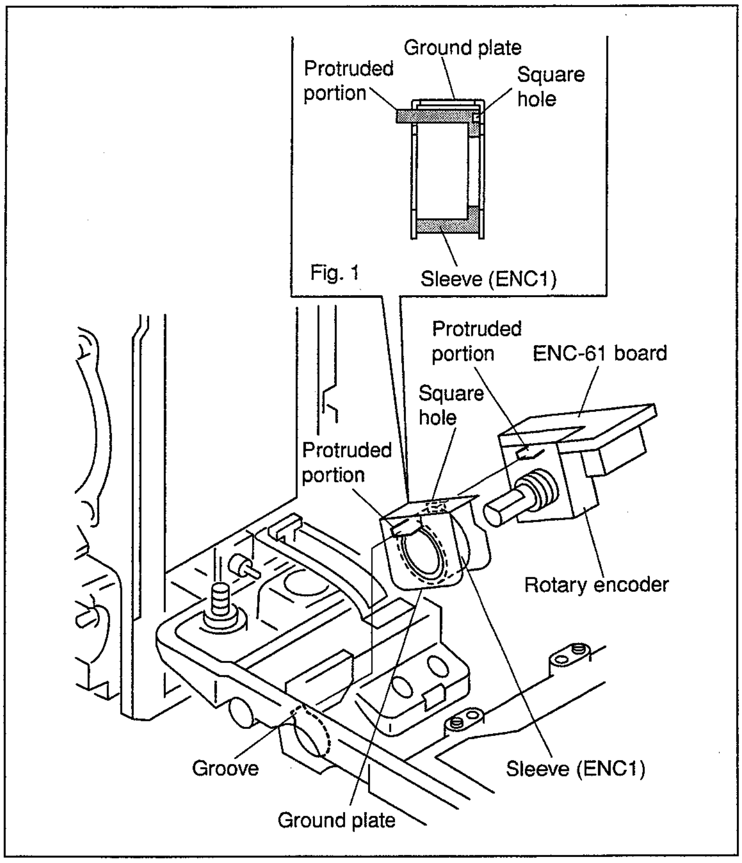
3. Insert a flat head (–) screwdriver tip between the RE knob and the inside panel assembly. Push the rotary encoder out and then remove the sleeve (ENC2).
4. Remove the ENC-61 board from the inside panel assembly and remove the sleeve (ENC1) and the ground plate.
5. Disconnect the harness from the connector (CN1) on the ENC-61 board.
6. Remove the soldering and remove the rotary encoder from the ENC-61 board.


Ground plate
Rotary encoder
ENC-61 board
CN1
Sleeve
(ENC2)
Sleeve (ENC1)
Flat head (–) screwdriver tip
Inside panel
assembly
RE knob

7. Install the new rotary encoder by reversing the steps of removal.

   Note

   When installing the ENC-61 board to the inside panel assembly, assemble the ground plate into the sleeve (ENC1) as shown in Fig. 1, and then insert the protruded portion of the rotary encoder into the square hole of the sleeve (ENC1). Then align the protruded portion of the sleeve (ENC1) with the groove of the inside panel assembly.


Ground plate
Protruded portion
Square hole
Fig. 1
Sleeve (ENC1)
Protruded portion
ENC-61 board
Square hole
Protruded portion
Rotary encoder
Groove
Sleeve (ENC1)
Ground plate

6-6. Connector Box Board Replacement

6-6-1. Removing the Connector Box Assembly

1. Remove the connector box.
   (Refer to Section 1-6.)

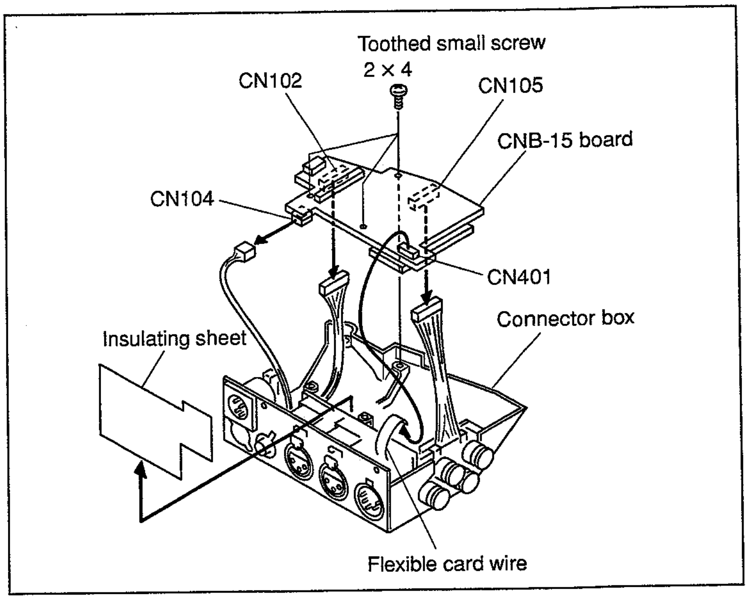
6-6-2. Removing the CNB-15 Board and AL-43 Board

1. Disconnect the flexible card wire from the connector (CN401) on the CNB-15 board.

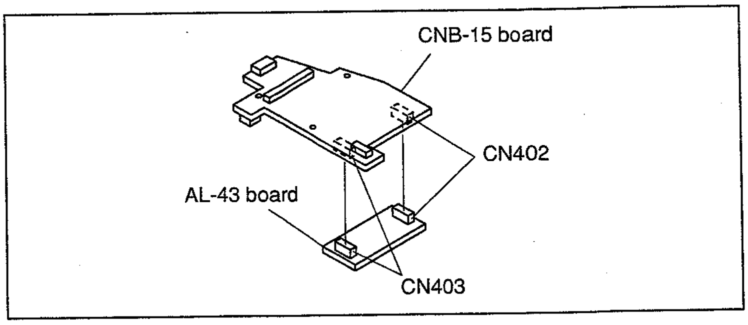
   Note

   Life of flexible card wire will be significantly shortened if it is folded. Be very careful not to fold the flexible card wire.

2. Remove the insulating sheet.
3. Remove the three screws. While removing the CNB-15 board, disconnect the harnesses from the connectors (CN102, CN104, CN105).

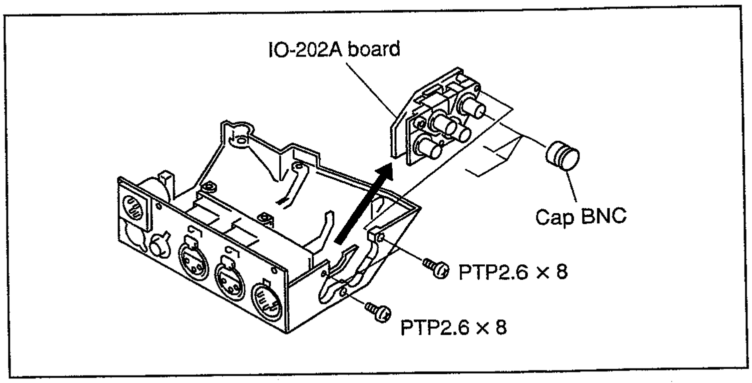

Toothed small screw
2 × 4
CN102
CN105
CNB-15 board
CN104
CN401
Connector box
Insulating sheet
Flexible card wire

4. Remove the AL-43 board from the connectors (CN402, CN403) that are connected to the CNB-15 board.


CNB-15 board
CN402
AL-43 board
CN403

6-6-3. Removing the IO-202A Board

1. Remove the four caps BNC. Remove the three screws and remove the IO-202A board in the direction of the arrow.

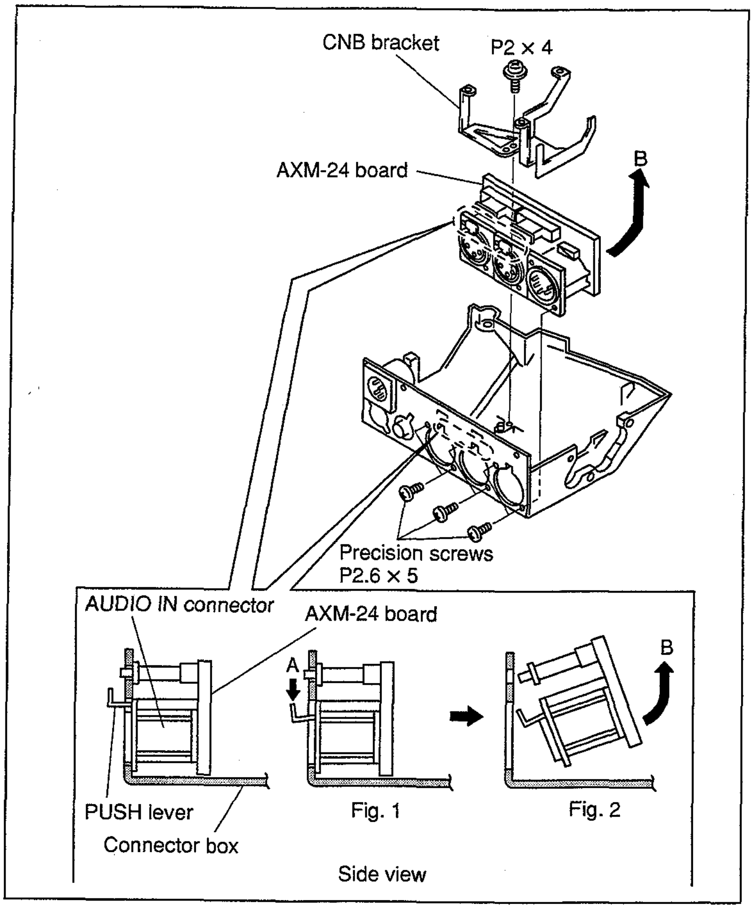

IO-202A board
Cap BNC
PTP2.6 × 8
PTP2.6 × 8

6-6-4. Removing the AXM-24 Board

1. Remove the screw (P2 × 4) and remove the CNB bracket.
2. Remove the six precision screws (P2.6 × 5) and remove the AXM-24 board in the direction of arrow B.

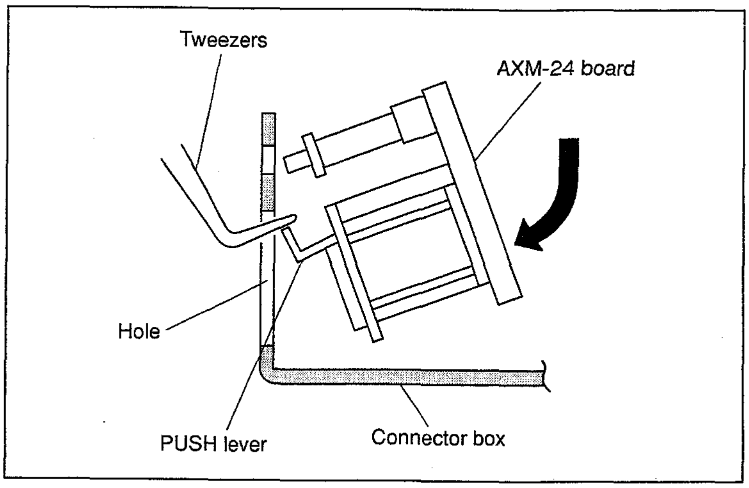
   Note

   When removing the AXM-24 board, push down the PUSH levers of the two AUDIO IN connectors simultaneously in the direction of arrow A and remove the AXM-24 board in the direction of arrow B.


CNB bracket
P2 × 4
AXM-24 board
B
Precision screws
P2.6 × 5
AUDIO IN connector
AXM-24 board
A
B
PUSH lever
Connector box
Fig. 1
Fig. 2
Side view

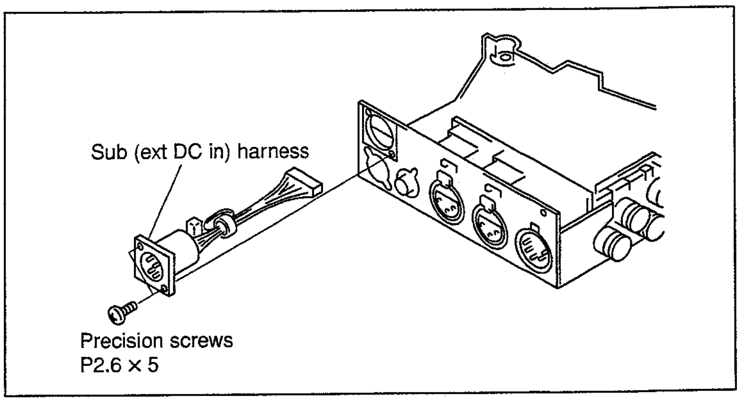
Note

When attaching the AXM-24 board to the connector box, push down the PUSH levers of the two AUDIO IN connectors simultaneously, and pass it through the hole of the connector box.


Tweezers
AXM-24 board
Hole
PUSH lever
Connector box

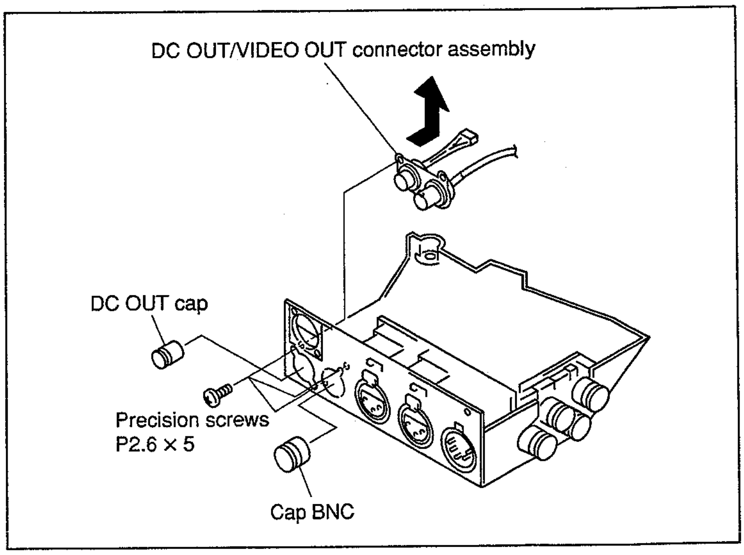
6-6-5. Removing the Sub (ext DC in) Harness

1. Remove the two precision screws and remove the sub (ext DC in) harness.

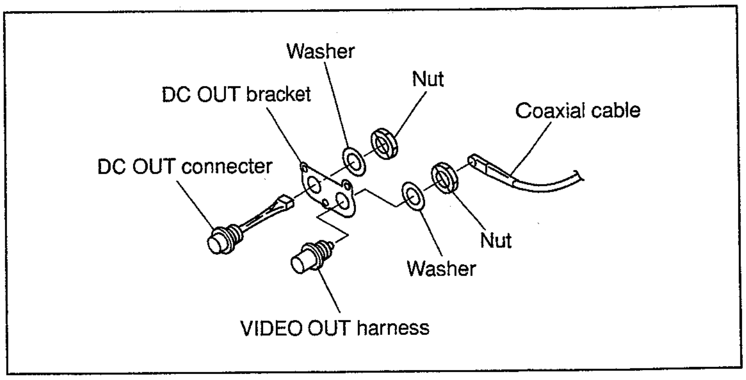

Sub (ext DC in) harness
Precision screws
P2.6 x 5

6-6-6. Removing the DC OUT/VIDEO OUT Connectors

1. Remove the cap BNC and DC OUT cap. Remove the three precision screws and remove the DC OUT/VIDEO OUT connector assembly in the direction of the arrow.


DC OUT/VIDEO OUT connector assembly
DC OUT cap
Precision screws
P2.6 x 5
Cap BNC

2. Disconnect the coaxial cable, nut and washer. Remove the VIDEO OUT harness from the DC OUT bracket.
3. Remove the nut and washer. Remove the DC OUT connector from the DC OUT bracket.


Washer
Nut
DC OUT bracket
Coaxial cable
DC OUT connecter
Nut
Washer
VIDEO OUT harness

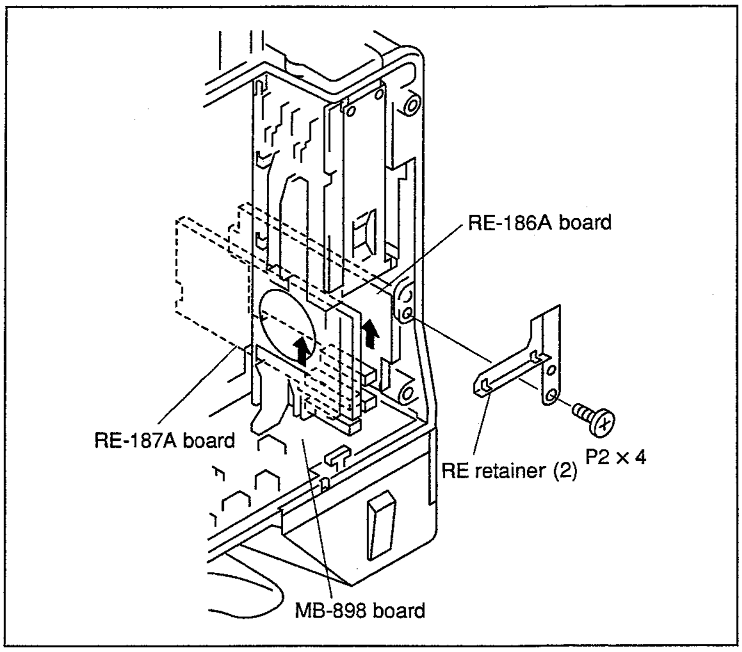
4. Install the new boards and the connectors by reversing the steps of removal.

6-7. DC-DC Converter Replacement

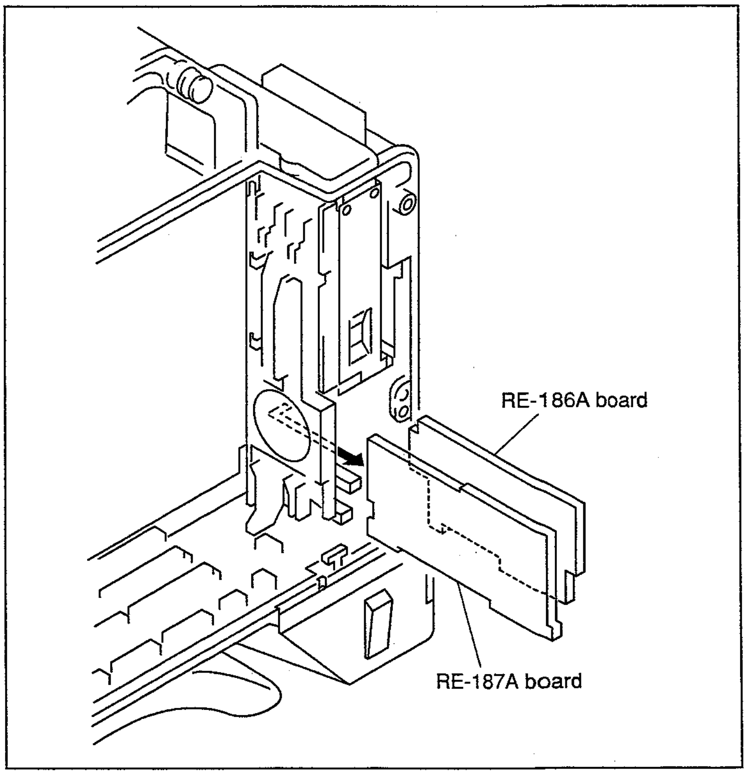
Note

The DC-DC converter consists of the two circuit boards that are the RE-186A board and RE-187A board. Replace them simultaneously.

1. Open the inside panel assembly. (Refer to Section 1-5.)
2. Remove the screw and remove the RE retainer (2).
3. Remove the RE-186A board and RE-187A board in the direction of the arrow, from the connectors that are connected to the MB-898 board.


RE-186A board
RE-187A board
RE retainer (2)
P2 x 4
MB-898 board

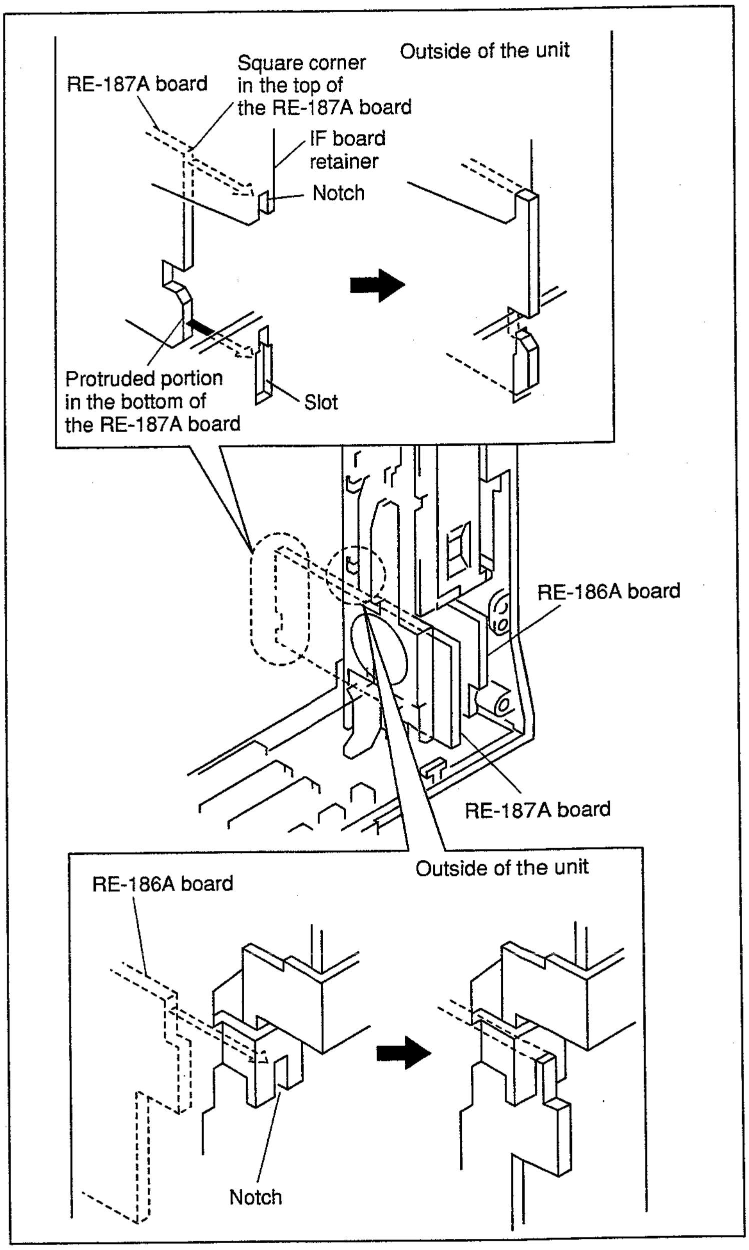
4. Remove the two circuit boards of the RE-186A board and RE-187A board together in the direction of the arrow as shown.


RE-186A board
RE-187A board

5. Install the new RE-186A board and RE-187A board by reversing the steps of removal.

Notes

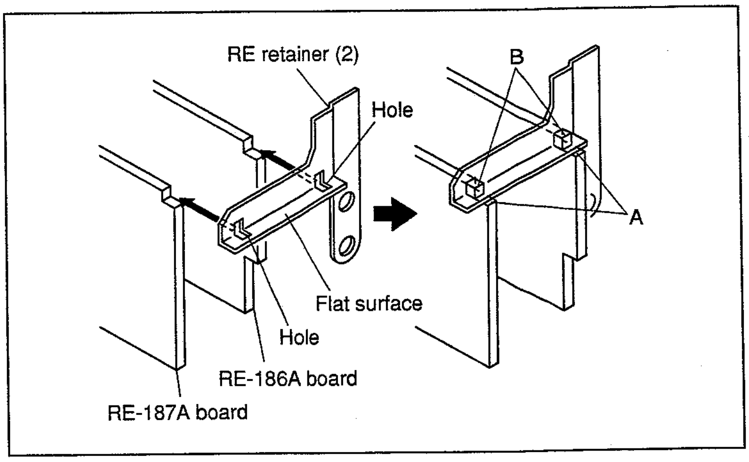
- When connecting the RE-186A board to the connector, confirm that the top of the board is firmly inserted in the notch on the outside of the DC-DC converter.
- When inserting the RE-187A board into the connector, perform as follows. The protruded portion in the bottom of the RE-187A board is inserted into the slot of the outside of the unit, and the square corner in the top of the RE-187A board is firmly inserted into the notch of the IF board retainer.


RE-187A board
Square corner in the top of the RE-187A board
Outside of the unit
IF board retainer
Notch
Protruded portion in the bottom of the RE-187A board
Slot
RE-186A board
RE-187A board
RE-186A board
Outside of the unit
Notch

Note

When fixing the RE-187A board and RE-186A board with the RE retainer (2), confirm the following points.

1. Confirm that the portions A (two locations) of each circuit board are pressed by the flat surface of the RE retainer (2).
2. Confirm that the portions B (two locations) of each circuit board have entered into the holes of the RE retainer (2).
3. Confirm that the connectors are securely inserted.


RE retainer (2)
Hole
B
A
Flat surface
Hole
RE-186A board
RE-187A board

6-8. Fan Replacement

Note

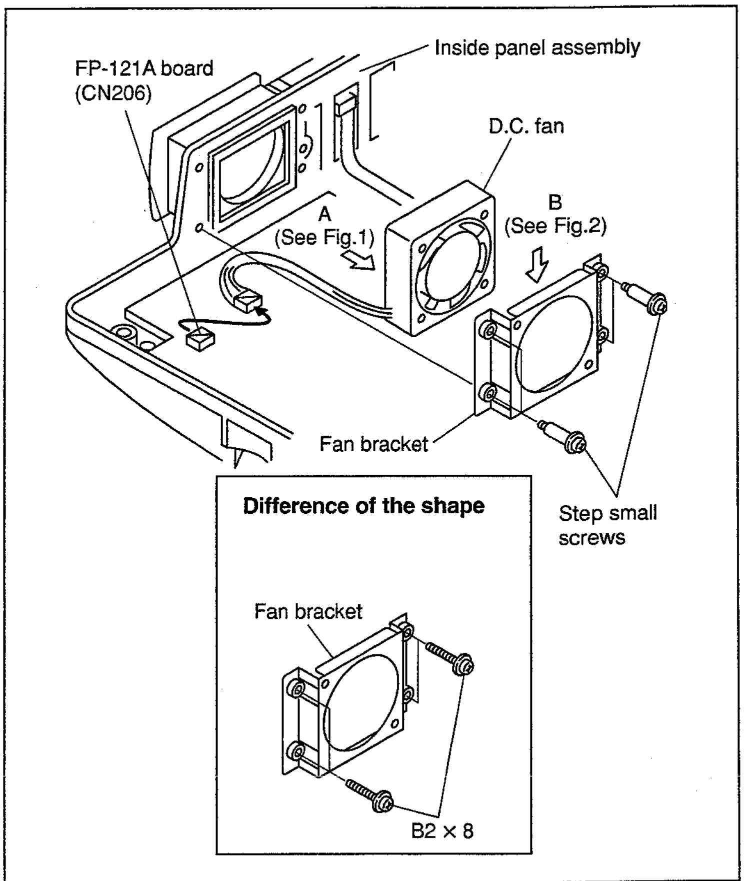
This unit has the two DC fans.

6-8-1. Replacing the Fan on the Inside Panel

1. Open the inside panel assembly.
   (Refer to Section 1-5.)
2. Disconnect the harness from the connector (CN206) on the FP-121A board.
3. Remove the four screws to remove the fan bracket and the DC fan.

   Note

   Depending on the time of production at the factory, there are sets that use the different shape of fan bracket and the different type of screws.

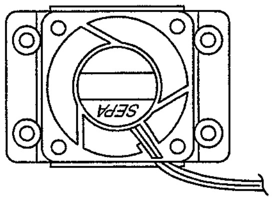

FP-121A board
(CN206)
Inside panel assembly
D.C. fan
A
(See Fig.1)
B
(See Fig.2)
Fan bracket
Step small screws
Difference of the shape
Fan bracket
B2 × 8

4. Install the new DC fan by reversing the steps of removal.

   Notes

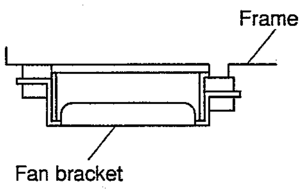
   - When attaching the DC fan, the fan must be attached in the direction as shown in Fig. 1.
   - When attaching the DC fan, the fan bracket must be attached in the direction as shown in Fig. 2.

Fig. 1



Direction of the fan when viewed from the direction of arrow A

Fig. 2


Frame
Fan bracket

Direction of the fan bracket when viewed from the direction of arrow B

6-8-2. Replacing the Fan in the Main Unit

1. Open the inside panel assembly. (Refer to Section 1-5.)
2. Remove the DC-DC converter. (Refer to Section 6-7.)
3. Loosen the two precision screws A fixing the flexible board retainer and remove the flexible board retainer in the direction of the arrow.
4. Disconnect the harness and the flexible card wire from the connectors (CN117, CN201) on the MB-898 board.

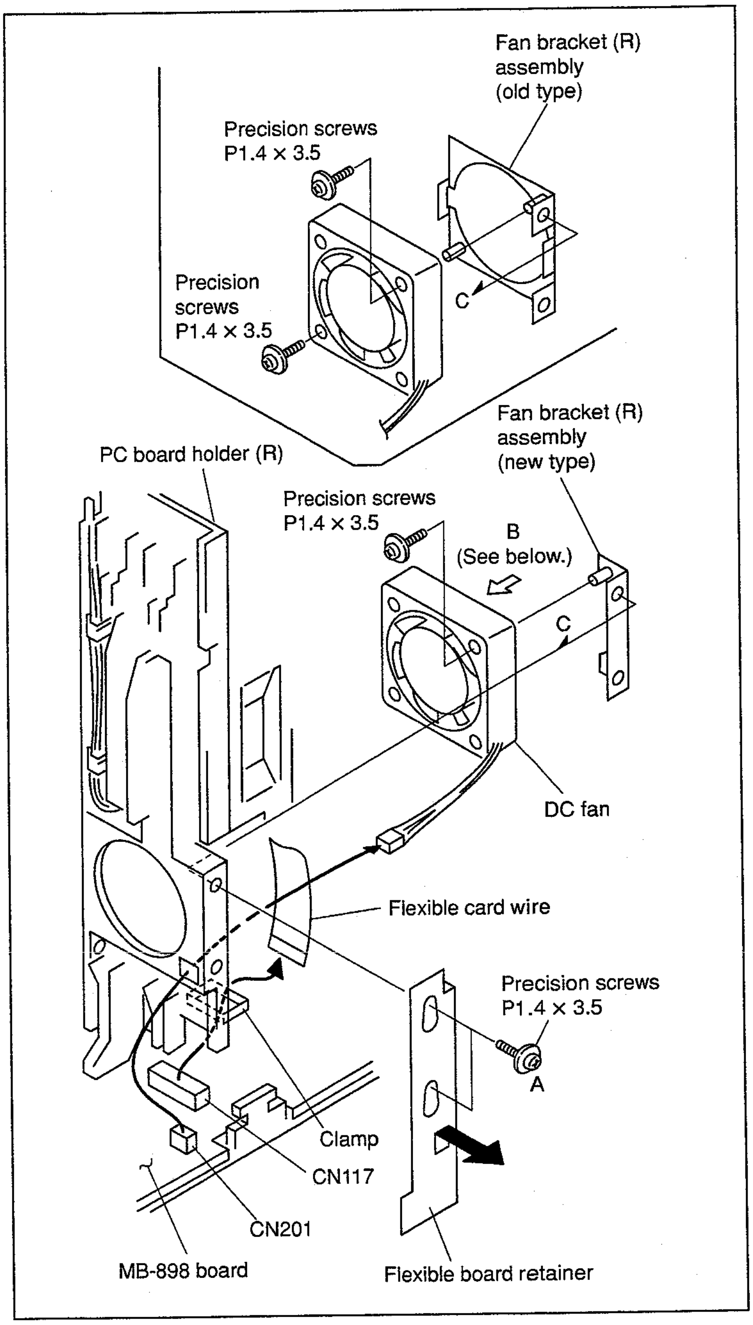
   Note

   - Life of flexible card wire will be significantly shortened if it is folded. Be very careful not to fold the flexible card wire.
   - When clamp is used, remove the flexible card wire from the clamp.

5. Remove the two precision screws A that are removed in step 3. Remove the DC fan assembly from the PC board holder (R).
6. Remove the precision screw (one screw in the new type or two screws in the old type) and remove the DC fan from the fan bracket (R) assembly.

   Note

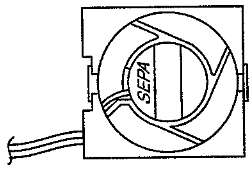
   Two types of the fan bracket (R) assembly is used depending on the time of production at the factory.


Fan bracket (R) assembly (old type)
Precision screws P1.4 × 3.5
Precision screws P1.4 × 3.5
C
Fan bracket (R) assembly (new type)
PC board holder (R)
Precision screws P1.4 × 3.5
B (See below.)
C
DC fan
Flexible card wire
Precision screws P1.4 × 3.5
A
Clamp
CN117
CN201
MB-898 board
Flexible board retainer

7. Install the new DC fan by reversing the steps of removal.

   Note

   When attaching the DC fan, the fan must be attached in the direction as shown in the illustration.



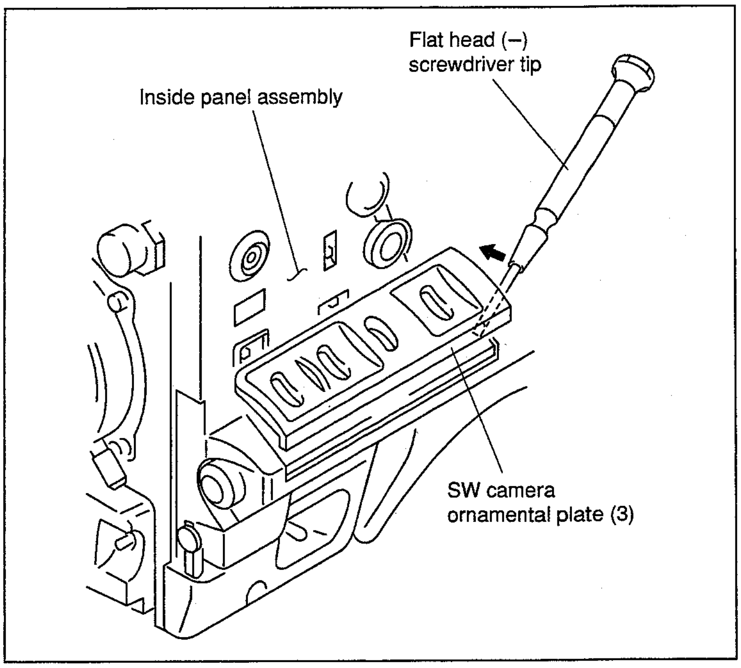
Direction of the fan when viewed from the direction of arrow B

6-9. SW Camera Ornamental Plate (3) Replacement

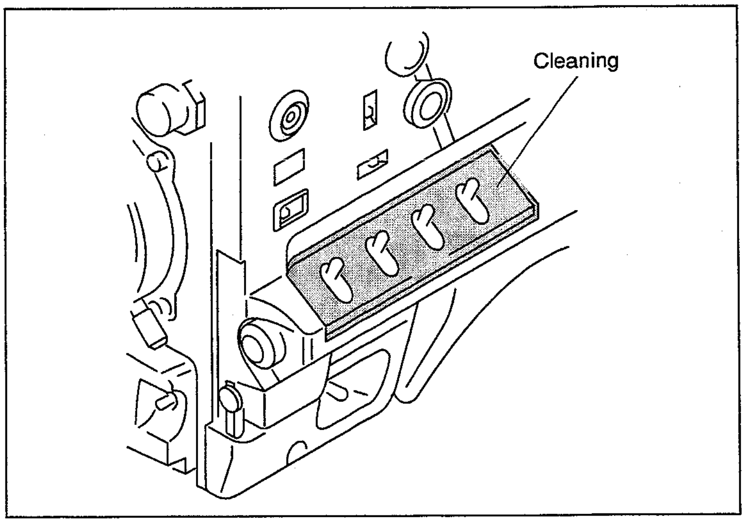
Note

The SW camera ornamental plate (3) is attached to the inside panel assembly with a both-sided adhesive tape.

1. Insert a flat head (−) screwdriver tip between the SW camera ornamental plate (3) and the inside panel assembly. Peel the plate off starting from its end gradually.


Flat head (−) screwdriver tip
Inside panel assembly
SW camera ornamental plate (3)

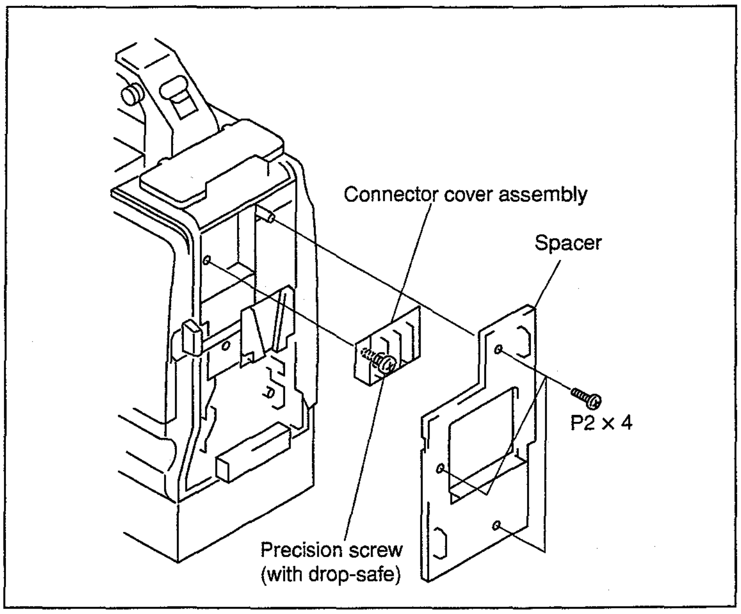
2. Clean the surface (the shaded portion ▨ shown in illustration) from which the SW camera ornamental plate (3) is peeled off.
3. Peel the protection sheet off the new SW camera ornamental plate (3) and attach it to the inside panel assembly.



6-10. 40P Fitting Bracket Assembly Replacement

Removal

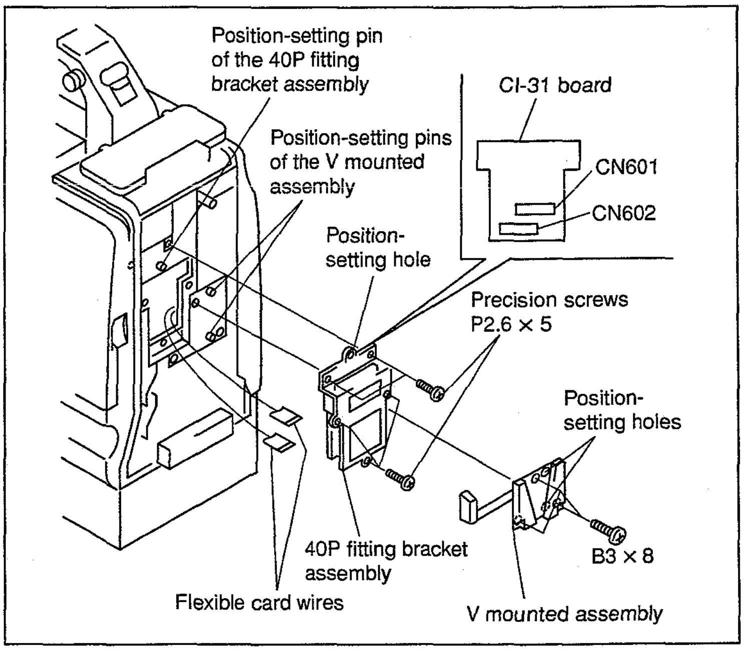
1. Remove the three screws (P2 × 4) and remove the spacer.
2. Loosen the precision screw (with drop-safe) and remove the connector cover assembly.


Connector cover assembly
Spacer
P2 x 4
Precision screw (with drop-safe)

3. Remove the three screws (B3 × 8) and remove the V mounted assembly.
4. Remove the five precision screws (P2.6 × 5). While removing the 40P fitting bracket assembly, disconnect the flexible card wires from the connectors (CN601, CN602) on the CI-31 board.

Note

Life of flexible card wire will be significantly shortened if it is folded. Be very careful not to fold the flexible card wire.


Position-setting pin of the 40P fitting bracket assembly
CI-31 board
Position-setting pins of the V mounted assembly
CN601
CN602
Position-setting hole
Precision screws P2.6 x 5
Position-setting holes
B3 x 8
40P fitting bracket assembly
Flexible card wires
V mounted assembly

Installation

5. Align the position-setting hole of the new 40P fitting bracket assembly with the position-setting pin of the frame. Install it with the five precision screws (P2.6 × 5).
Standard tightening torque :
53×10^{-2} N•m (5.3 kgf•cm)

6. Align the position-setting hole of the V mounted assembly with the position-setting pin of the frame. Install it with the three screws (B3 × 8).
Standard tightening torque :
80×10^{-2} N•m (8 kgf•cm)

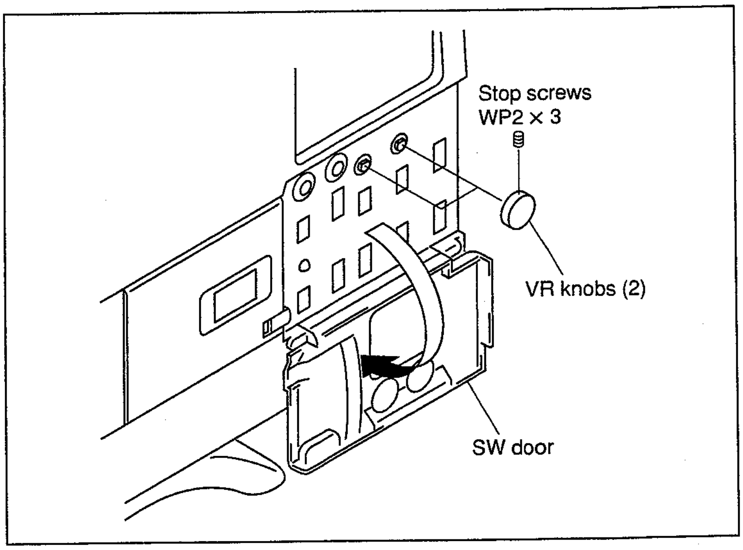
7. Install the connector cover assembly and spacer by reversing the steps of removal.

6-11. MS Lid Assembly Replacement

1. Open the SW door of the inside panel assembly in the direction of the arrow. Remove the two set screws and remove the two VR knobs (2).

   Note

   The VR knob (2) without stop screw is used depending on the time of production at the factory.


Stop screws
WP2 × 3
VR knobs (2)
SW door

2. Open the inside panel assembly. (Refer to Section 1-5.)
3. Remove the screw and the FR flexible cable retainer.

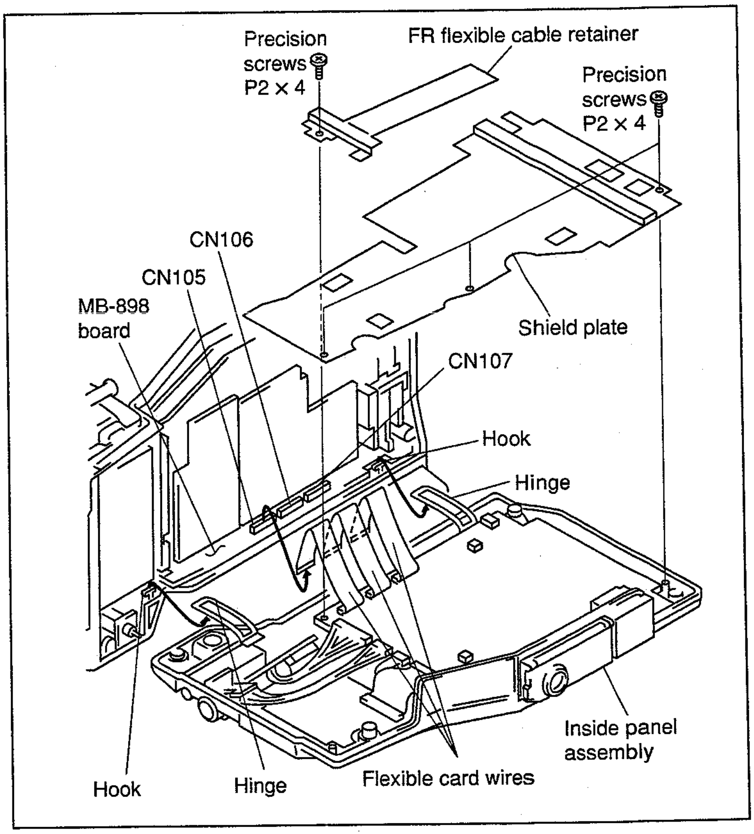
   Note

   Depending on the time of production at the factory, some production units do not use the FR flexible cable retainer.
4. Remove the three precision screws and remove the shield plate.
5. Disconnect the flexible card wires from the connectors (CN105 to CN107) on the MB-898 board.

   Note

   Life of flexible card wire will be significantly shortened if it is folded. Be very careful not to fold the flexible card wire.

6. Disengage the hinge from the two hooks and remove the inside panel assembly from the unit.


Precision screws
P2 × 4
FR flexible cable retainer
Precision screws
P2 × 4
CN106
CN105
MB-898 board
Shield plate
CN107
Hook
Hinge
Inside panel assembly
Hook
Hinge
Flexible card wires

7. Disconnect the harness and the flexible card wire from the connectors (CN201 to CN207 and CN303) on the FP-121A board.

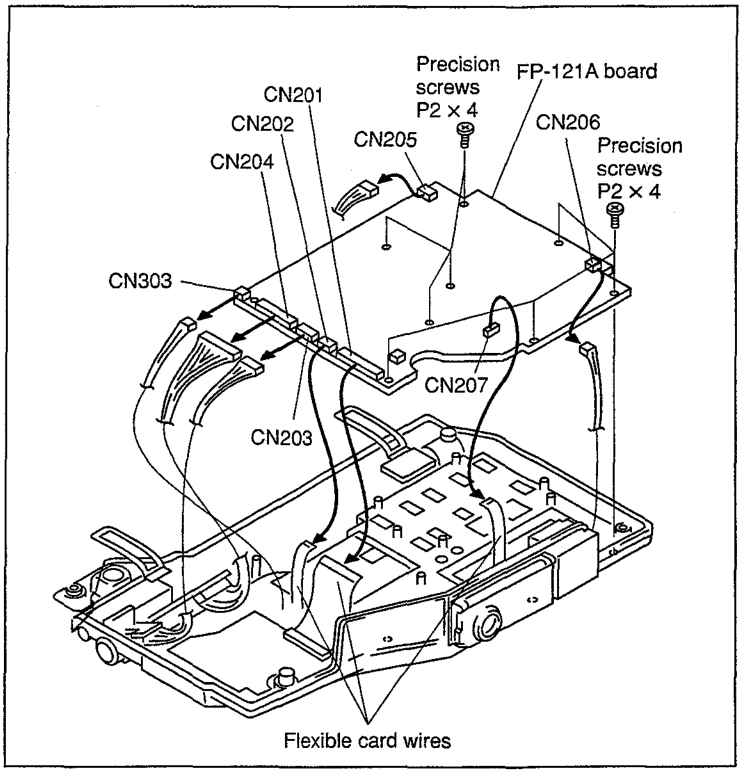
   Note

   Life of flexible card wire will be significantly shortened if it is folded. Be very careful not to fold the flexible card wire.

8. Remove the eight screws and remove the FP-121A board.

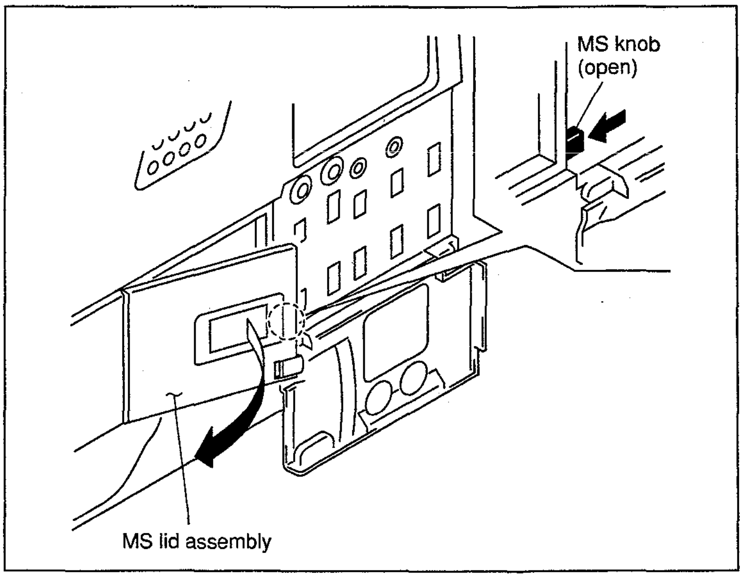
   Note

   In the units that do not use the FR flexible cable retainer, remove the nine screws.



Precision screws P2 × 4
FP-121A board
CN201
CN202
CN205
CN206
Precision screws P2 × 4
CN204
CN303
CN207
CN203
Flexible card wires

9. Press the MS knob on the front of the inside panel assembly to unlock and open the MS lid assembly in the direction of the arrow.

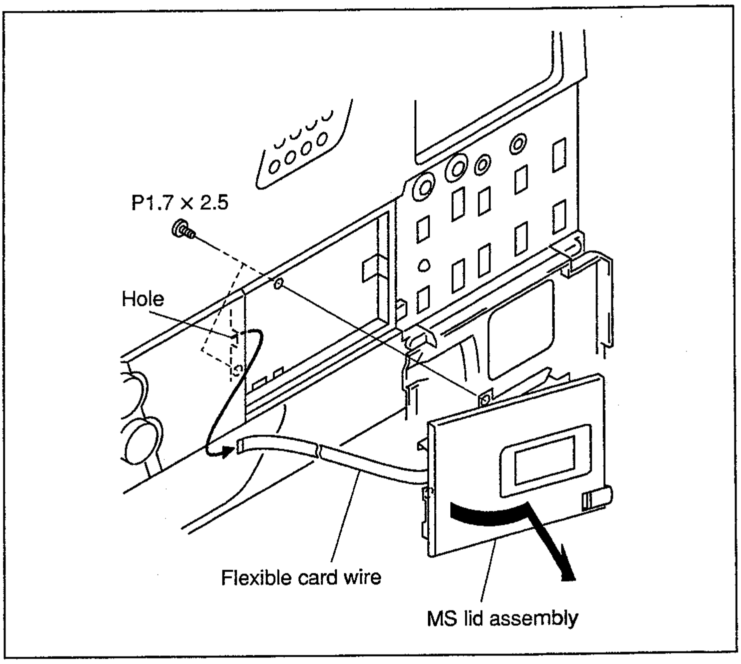


MS knob (open)
MS lid assembly

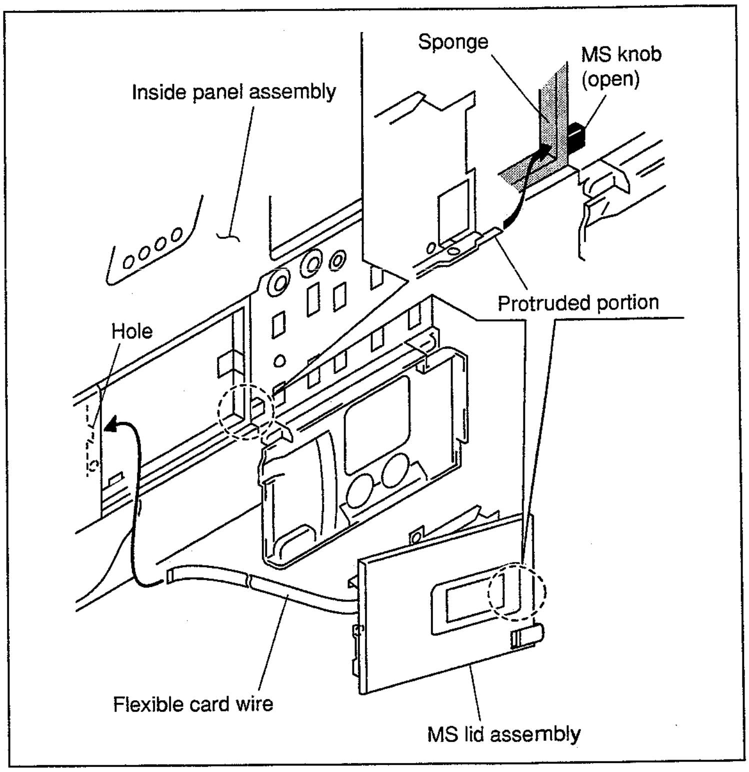
10. Remove the two screws. While removing the MS lid assembly in the direction of the arrow, disconnect the flexible card wire from through the hole.

    Note

    Life of flexible card wire will be significantly shortened if it is folded. Be very careful not to fold the flexible card wire.


P1.7 x 2.5
Hole
Flexible card wire
MS lid assembly

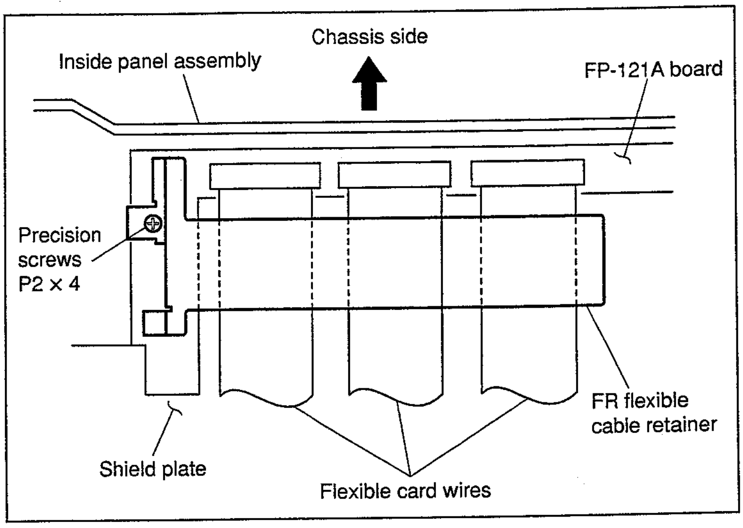
11. When installing the new MS lid assembly into the inside panel assembly, insert the flexible card wire into the hole first. Then, while pressing the protruded portion of the MS lid assembly against the sponge on the back of the MS knob (open), insert it into the inside panel assembly.


Sponge
MS knob
(open)
Inside panel assembly
Protruded portion
Hole
Flexible card wire
MS lid assembly

12. Install the new MS lid assembly by reversing the steps of removal.

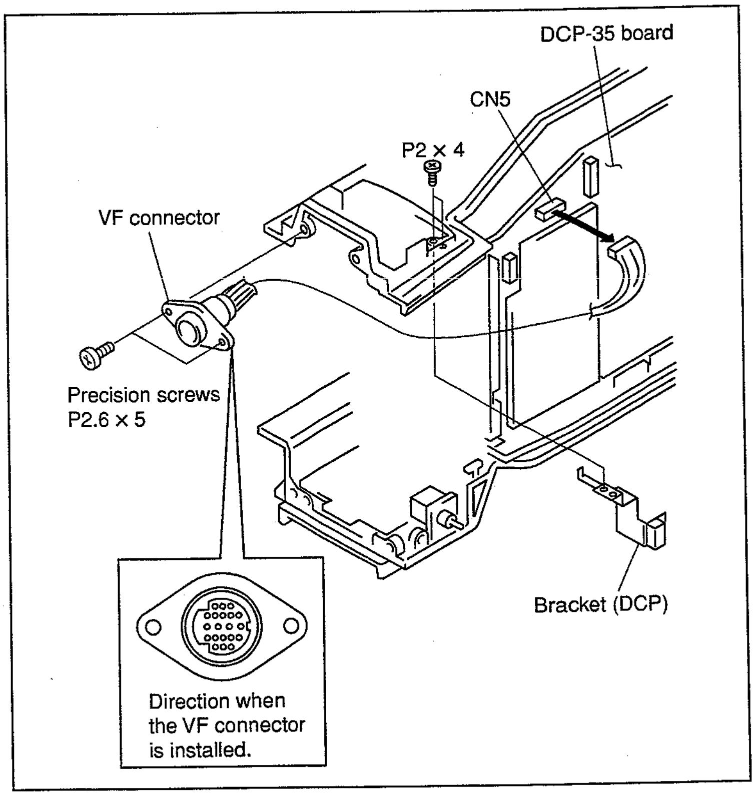
Note on installation

When the FR flexible cable retainer is available, secure the flexible card wire with it as shown.


Chassis side
Inside panel assembly
FP-121A board
Precision screws P2 x 4
FR flexible cable retainer
Shield plate
Flexible card wires

6-12. VF Connector Replacement

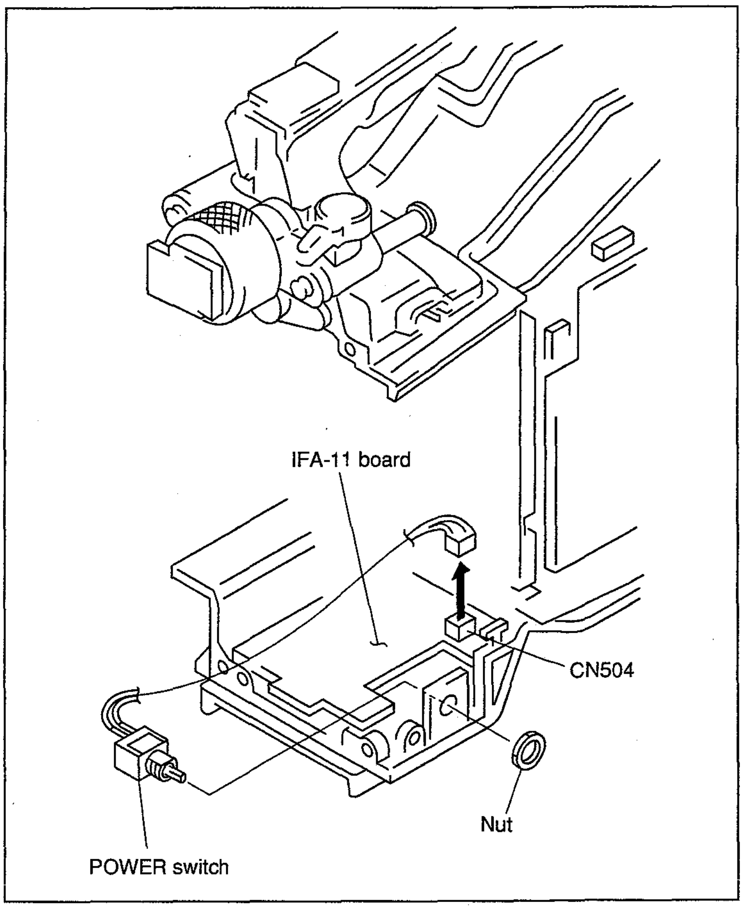
1. Remove the outside panel assembly. (Refer to Section 1-4.)
2. Open the inside panel assembly. (Refer to Section 1-5.)
3. Remove the front assembly. (Refer to Section 6-1-1.)
4. Remove the handle assembly. (Refer to Section 6-22.)
5. Remove the two screws (P2 × 4) and remove the bracket (DCP).
6. Disconnect the harness from the connector (CN5) on the DCP-35 board.
7. Remove the two precision screws (P2.6 × 5) and remove the VF connector.


DCP-35 board
CN5
P2 x 4
VF connector
Precision screws P2.6 x 5
Bracket (DCP)
Direction when the VF connector is installed.

8. Install the new VF connector by reversing the steps of removal.

6-13. POWER Switch Replacement

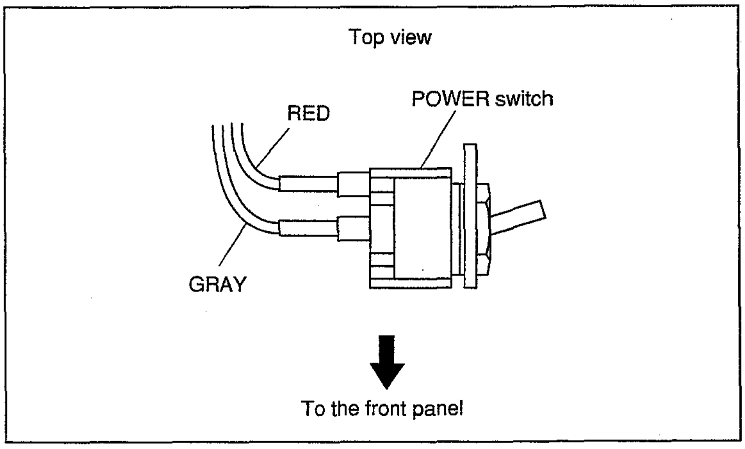
1. Remove the outside panel assembly. (Refer to Section 1-4.)
2. Open the inside panel assembly. (Refer to Section 1-5.)
3. Remove the front assembly. (Refer to Section 6-1-1.)
4. Disconnect the harness from the connector (CN504) on the IFA-11 board.
5. Remove the nut and remove the POWER switch.


IFA-11 board
CN504
Nut
POWER switch

6. Install the new POWER switch by reversing the steps of removal.

Note

When the POWER switch is installed, direction of the POWER switch must be set as shown in the illustration.


Top view
RED
POWER switch
GRAY
To the front panel

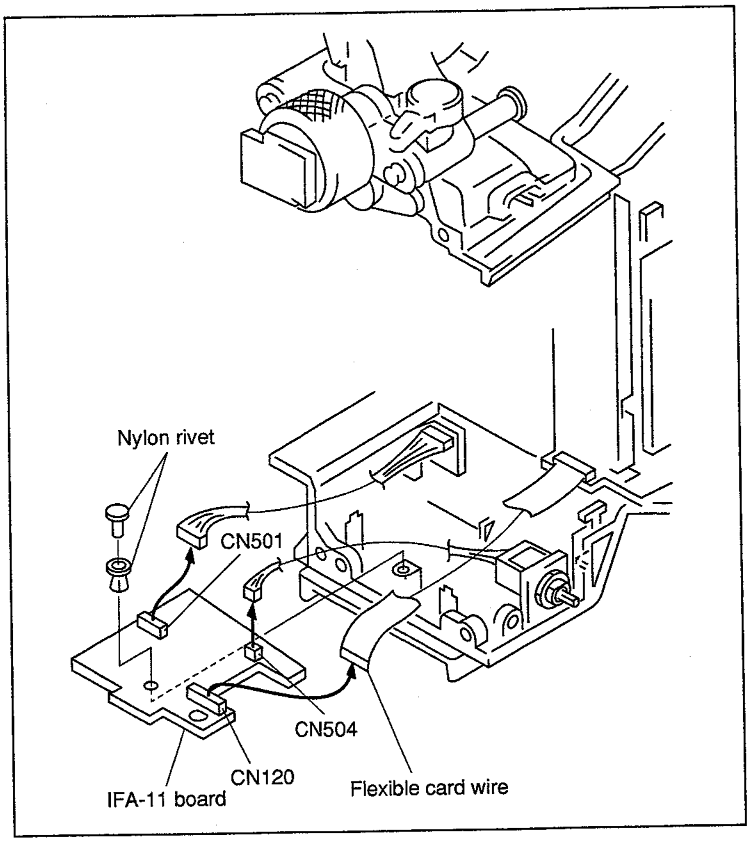
6-14. IFA-11 Board Replacement

1. Remove the outside panel assembly.
   (Refer to Section 1-4.)
2. Open the inside panel assembly.
   (Refer to Section 1-5.)
3. Remove the front assembly.
   (Refer to Section 6-1-1.)
4. Disconnect the harness and flexible card wire from the connectors (CN120, CN501, CN504) on the IFA-11 board.

   Note

   Life of flexible card wire will be significantly shortened if it is folded. Be very careful not to fold the flexible card wire.

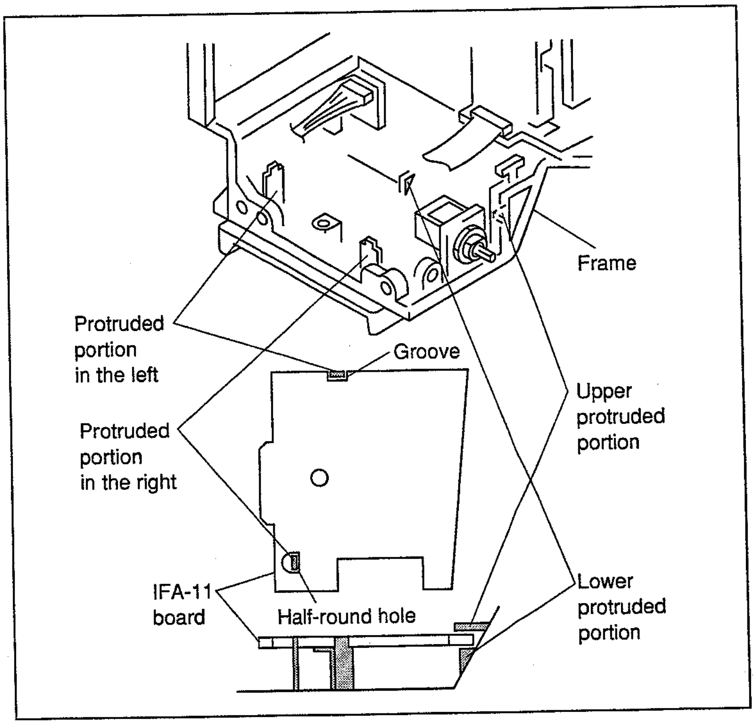
5. Remove the nylon rivet and remove the IFA-11 board.


Nylon rivet
CN501
CN504
CN120
IFA-11 board
Flexible card wire

6. When installing the new IFA-11 board to the frame, insert the protruded portion in the right to the half-round hole and insert the protruded portion in the left into the groove. Then install the IFA-11 board between the upper and lower protruded portions.

   Note

   Upon completion of the IFA-11 board replacement, remove EEPROM (IC202) from the former board and install it to the new board.


Frame
Protruded portion in the left
Groove
Upper protruded portion
Protruded portion in the right
IFA-11 board
Half-round hole
Lower protruded portion

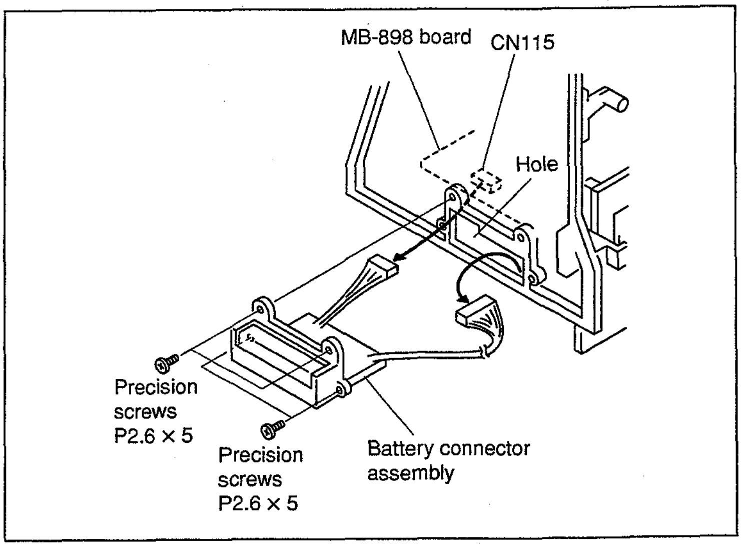
7. Install it by reversing the steps of removal.

6-15. Battery Connector Assembly (DC-111 Board) Replacement

1. Open the inside panel assembly.
   (Refer to Section 1-5.)
2. Remove the plug-in boards.
   (Refer to Section 1-7.)
3. Remove the connector box assembly.
   (Refer to Section 1-6.)
4. Disconnect the harness from the connector (CN115) on the MB-898 board.
5. Remove the four precision screws. While removing the battery connector assembly, pull the two harnesses out of the hole.

   Note

   Be careful not to damage the harness as it is caught by the frame.


MB-898 board
CN115
Hole
Precision screws P2.6 x 5
Precision screws P2.6 x 5
Battery connector assembly

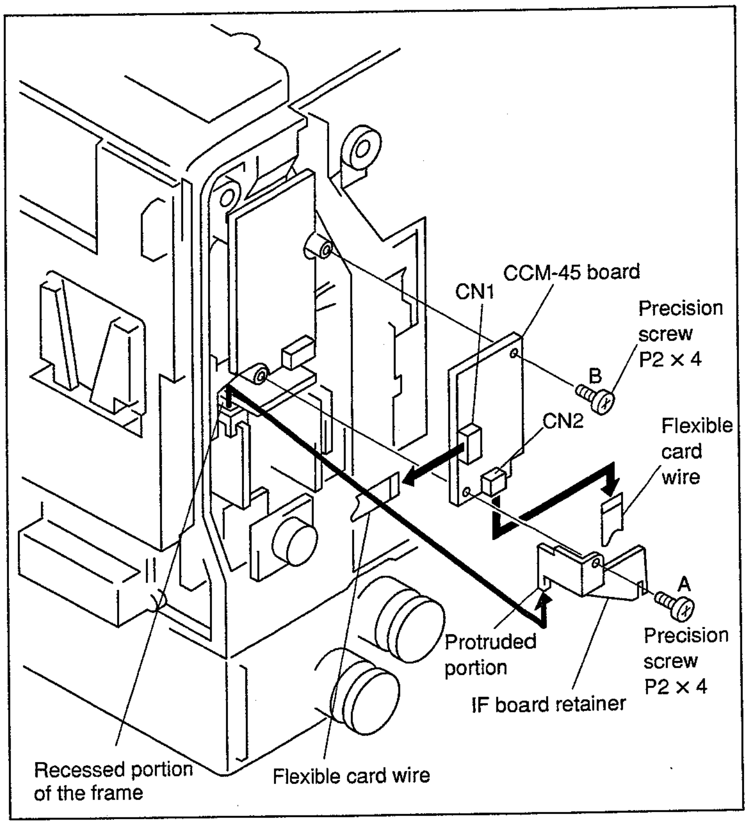
6. Install the new battery connector assembly by reversing the steps of removal.
   Standard tightening torque :
   40×10^{-2} N•m (4 kgf•cm)

6-16. CCM-45 Board Replacement

1. Remove the outside panel assembly.
   (Refer to Section 1-4.)
2. Disconnect the flexible card wires from the connectors (CN1, CN2) on the CCM-45 board.

   Note

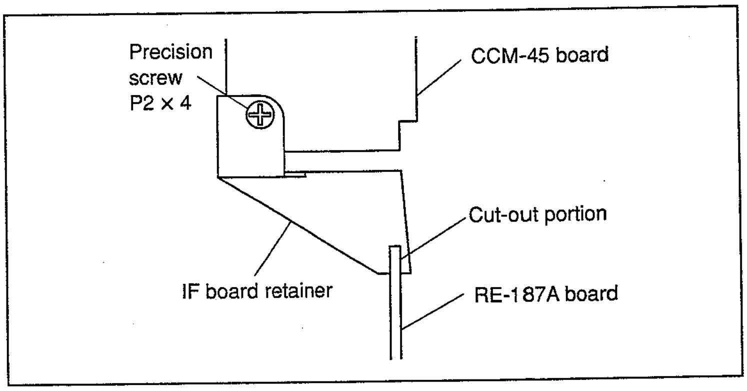
   Life of flexible card wire will be significantly shortened if it is folded. Be very careful not to fold the flexible card wire.
3. Loosen the precision screw A and remove the protruded portion of the IF retainer from the recessed portion of the frame.
4. Remove the precision screw B and remove the CCM-45 board.


CCM-45 board
CN1
Precision screw P2 x 4
B
CN2
Flexible card wire
A
Protruded portion
Precision screw P2 x 4
IF board retainer
Recessed portion of the frame
Flexible card wire

5. Install the new CCM-45 board by reversing the steps of removal.

   Note

   When install the IF board retainer to the RE-187A board, insert the cut-out portion of the IF board securely into the RE-187A board.

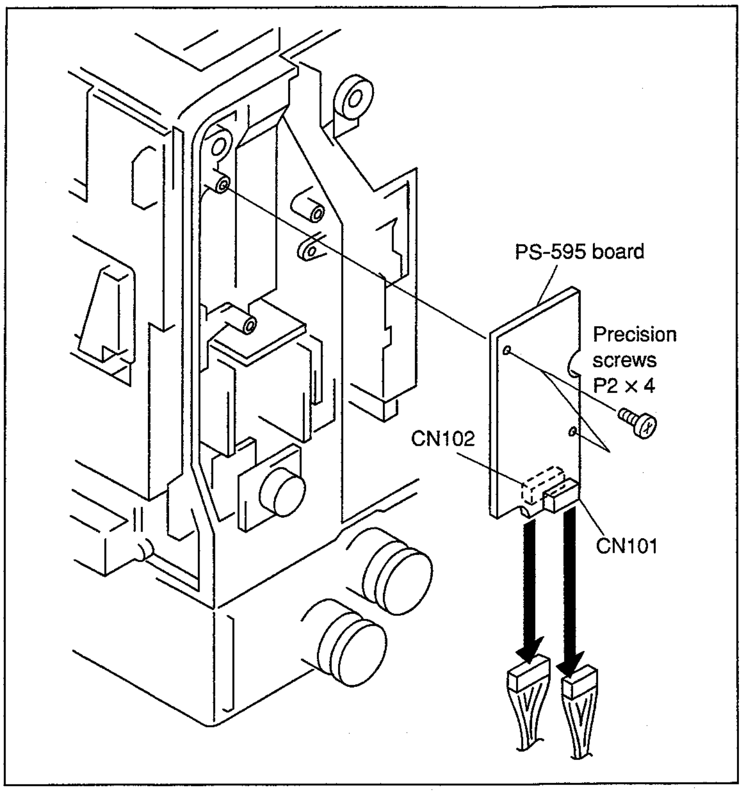

Precision screw P2 x 4
CCM-45 board
Cut-out portion
IF board retainer
RE-187A board

Adjustment after Replacement

Antenna tuning frequency adjustment
(Refer to Section 10-3-2.)

6-17. PS-595 Board Replacement

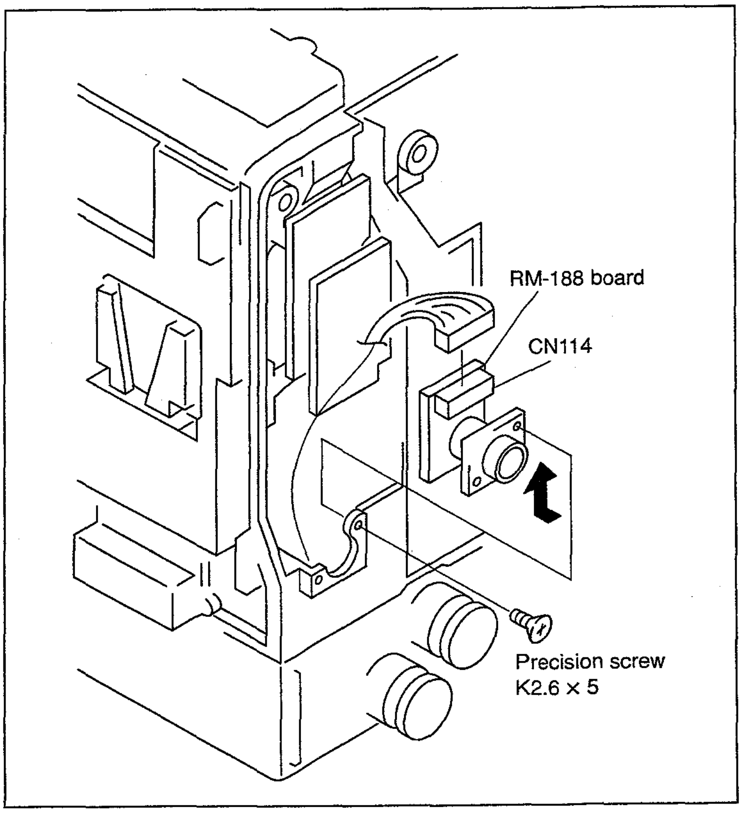
1. Remove the outside panel assembly.
   (Refer to Section 1-4.)
2. Remove the CCM-45 board.
   (Refer to Section 6-16.)
3. Remove the two precision screws. While removing the PS-595 board, disconnect the harness from the connector (CN101, CN102).


PS-595 board
Precision screws P2 x 4
CN102
CN101

4. Install the new PS-595 board by reversing the steps of removal.

6-18. RM-188 Board Replacement

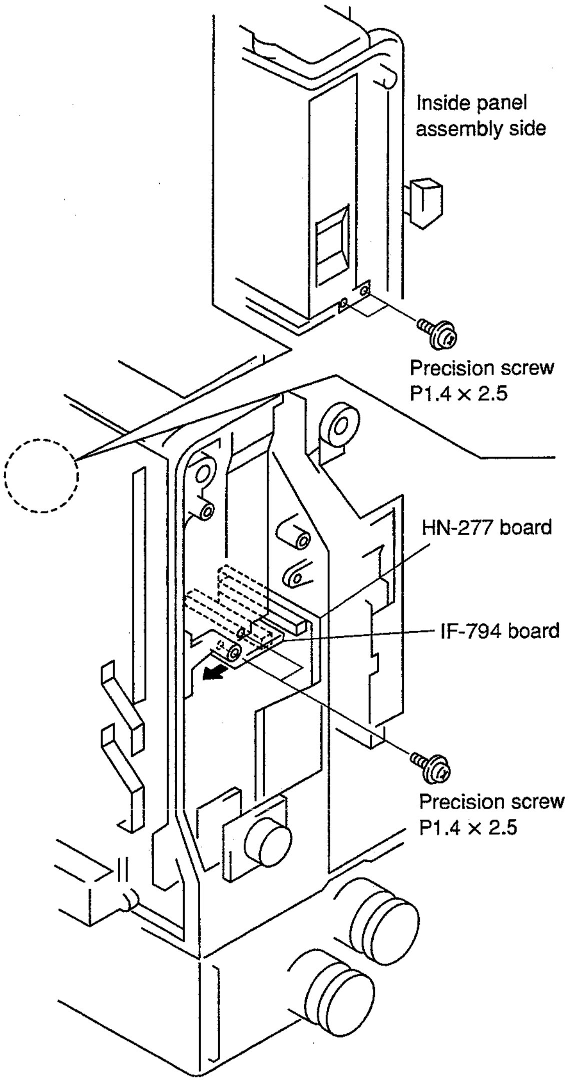
1. Remove the outside panel assembly.
   (Refer to Section 1-4.)
2. Open the inside panel assembly.
   (Refer to Section 1-5.)
3. Remove the DC-DC converter.
   (Refer to Section 6-7.)
4. Remove the two precision screws. While removing the RM-188 board in the direction of the arrow, disconnect the harness from the connector (CN114).



5. Install the new RM-188 board by reversing the steps of removal.

6-19. IF-794 Board, RX-54 Board Replacement

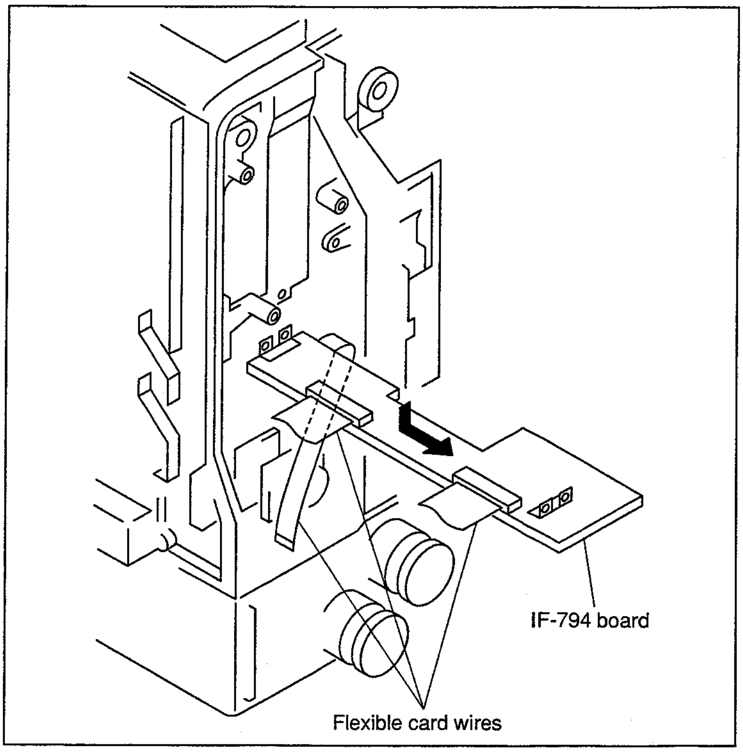
1. Remove the outside panel assembly. (Refer to Section 1-4.)
2. Open the inside panel assembly. (Refer to Section 1-5.)
3. Remove the DC-DC converter. (Refer to Section 6-7.)
4. Remove the CI-31board. (Refer to Section 6-10.)
5. Remove the CCM-45 board. (Refer to Section 6-16.)
6. Remove the PS-595 board. (Refer to Section 6-17.)
7. Remove the four precision screws fixing the IF-794 board and remove the connector connecting the IF-794 board with the HN-277 board.


Inside panel assembly side
Precision screw P1.4 × 2.5
HN-277 board
IF-794 board
Precision screw P1.4 × 2.5

8. Remove the IF-794 board in the direction of the arrow.

Note

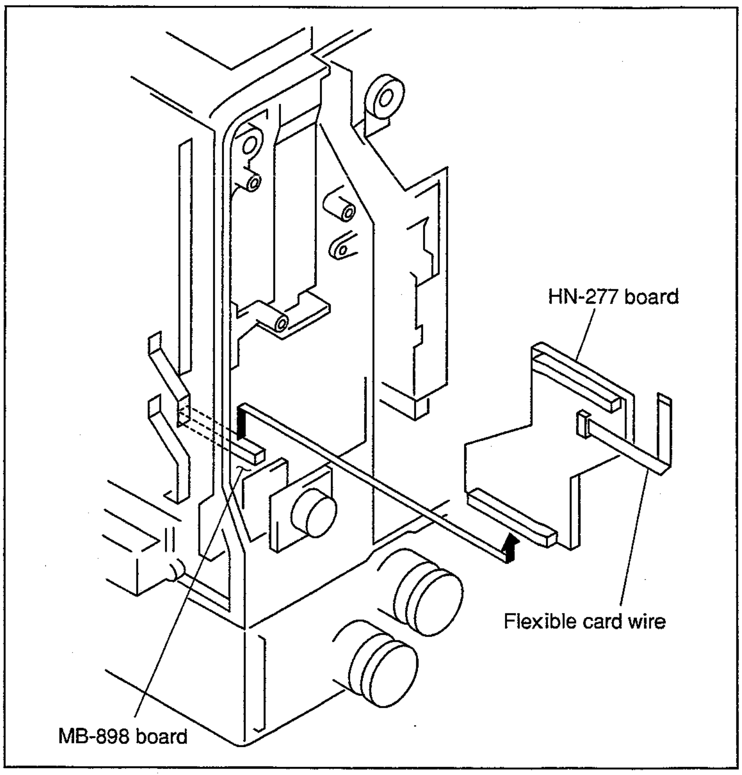
The flexible card wire is used in the IF-794 board. Life of flexible card wire will be significantly shortened if it is folded. Be very careful not to fold the flexible card wire.


IF-794 board
Flexible card wires

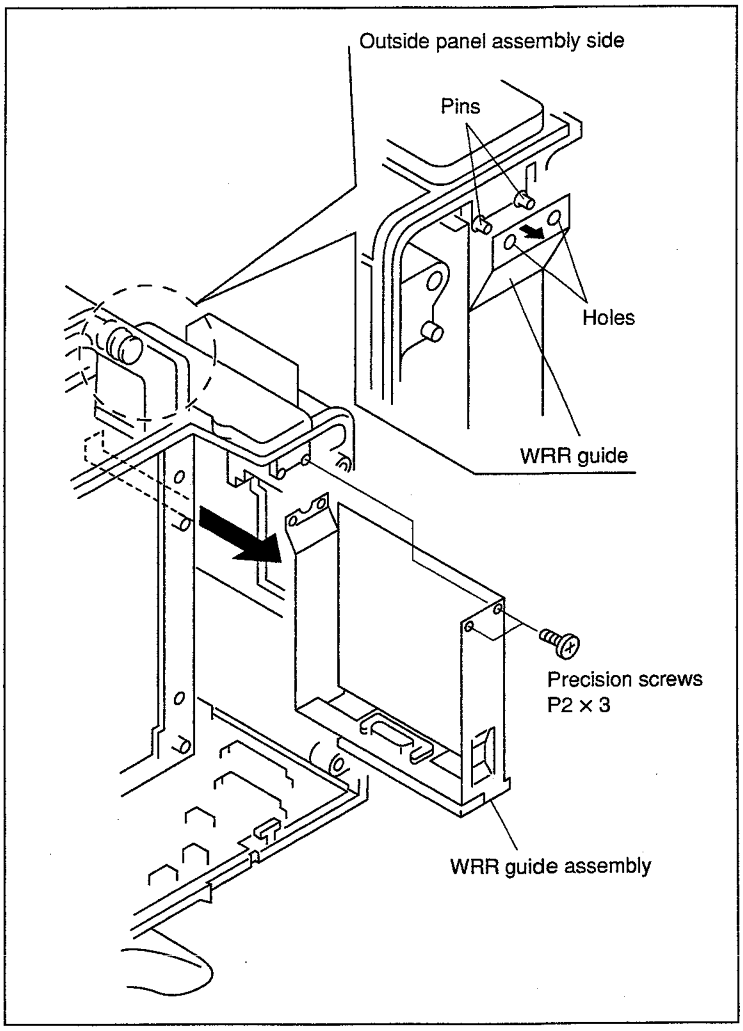
9. Remove the connector connecting the MB-898 board with the HN-277 board. Remove the HN-277 board in the direction of the arrow.

Note

The flexible card wire is used in the HN-277 board. Life of flexible card wire will be significantly shortened if it is folded. Be very careful not to fold the flexible card wire.


HN-277 board
Flexible card wire
MB-898 board

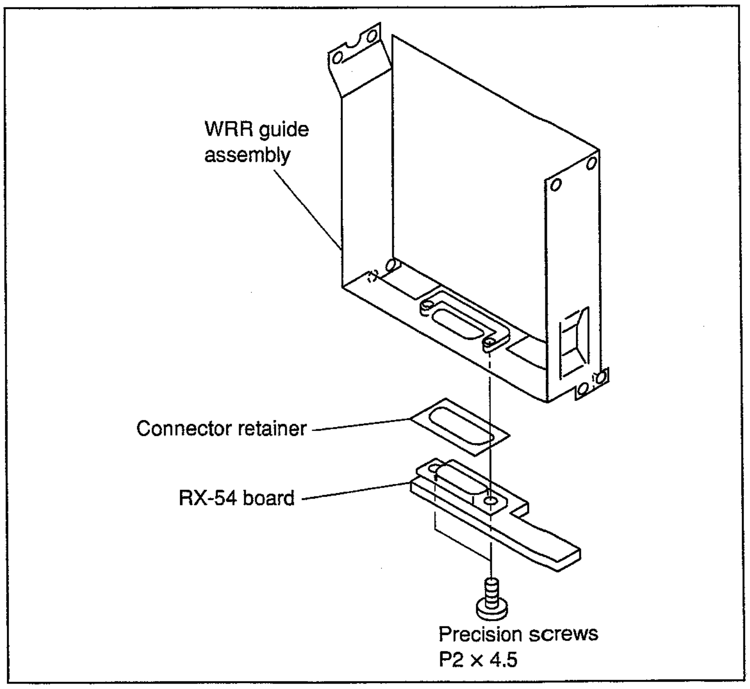
10. Remove the two precision screws. Remove the hole of the WRR guide from the pin and remove the WRR guide assembly in the direction of the arrow.


Outside panel assembly side
Pins
Holes
WRR guide
Precision screws
P2 × 3
WRR guide assembly

11. Remove the two precision screws and remove the RX-54 board.

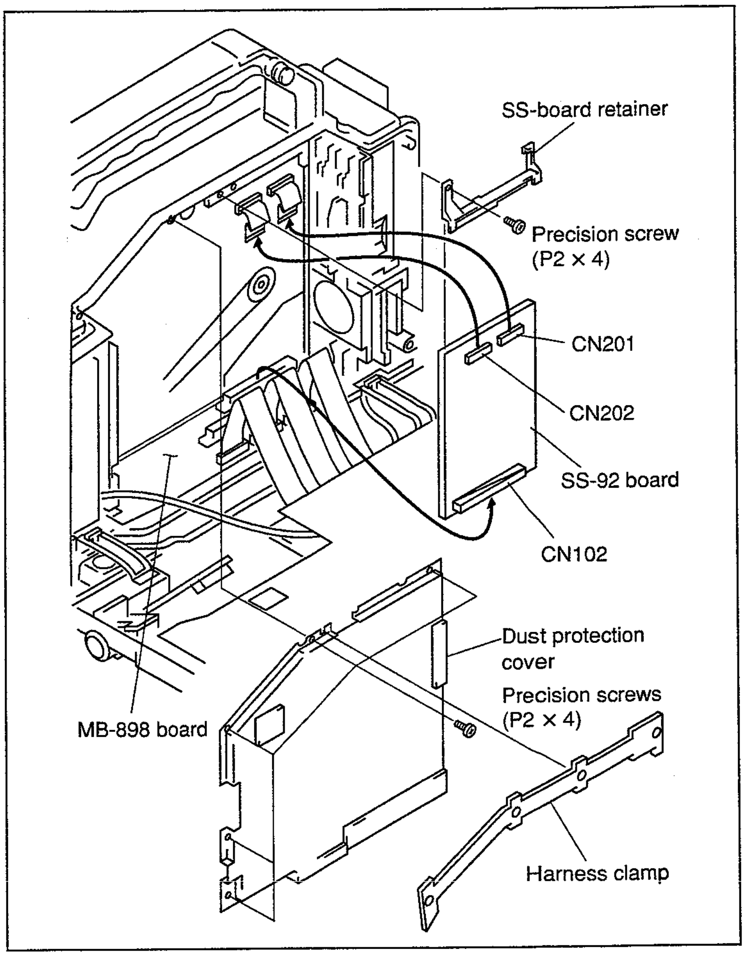
Note

Be careful not lose the connector retainer.


WRR guide
assembly
Connector retainer
RX-54 board
Precision screws
P2 × 4.5

12. Install the new IF-794 board and RX-54 board by reversing the steps of removal.

6-20. SS-92 Board Replacement


SS-board retainer
Precision screw
(P2 x 4)
CN201
CN202
SS-92 board
CN102
Dust protection
cover
Precision screws
(P2 x 4)
MB-898 board
Harness clamp

1. Open the inside panel assembly.
   (Refer to Section 1-5.)
2. Remove the plug-in boards.
   (Refer to Section 1-7.)
3. Remove the harness clamp.

   Note

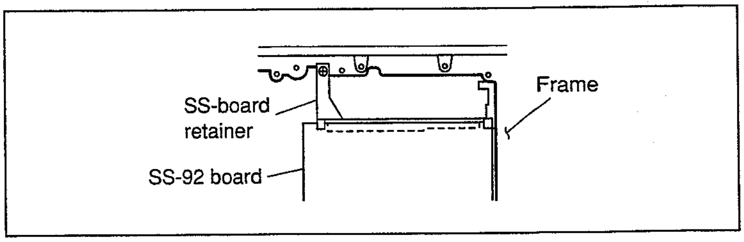
   When the unit under servicing uses the harness clamp that has exactly the same shape as shown in illustration, remove it.

4. Remove the five precision screws and remove the dust protection cover.
5. Disconnect the flexible card wires from the connectors (CN201, CN202) on the SS-92 board.

   Note

   Life of flexible card wires will be significantly shortened if it is folded. Be very careful not to fold the flexible card wire.

6. Remove the precision screw and remove the SS-board retainer.
7. While loosening the connector (CN102), remove the SS-92 board that is connected to the MB-898 board.


Frame
SS-board
retainer
SS-92 board

8. Install the new SS-92 board by reversing the steps of removal.

   Note

   Check that the SS-board retainer is firmly inserted in between the frame and the SS-92 board so that the SS-92 board is securely fixed.

6-21. LP-114 Board Replacement

1. Remove the precision screw (P2.6 × 5) and remove the rear cover assembly in the direction of the arrow.

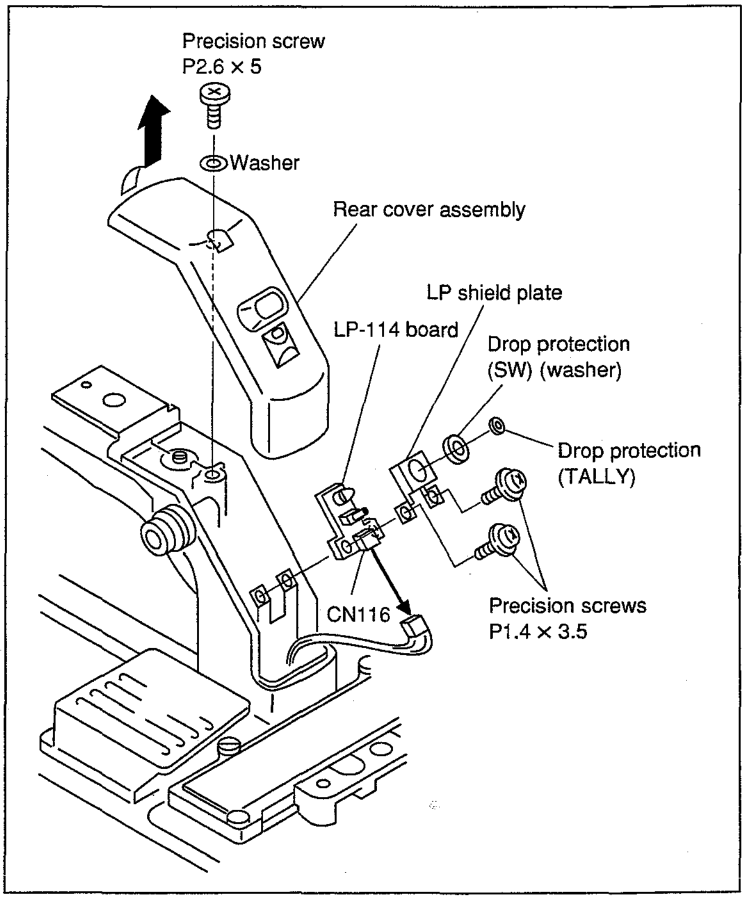
   Notes

   - Be careful not to lose the washer.
   - The two drop protections are not fixed. Be careful not to lose it.

2. Disconnect the harness from the connector (CN116) on the LP-114 board.
3. Remove the two precision screws (P1.4 × 3.5) and remove the LP shield plate and the LP-114 board.

   Note

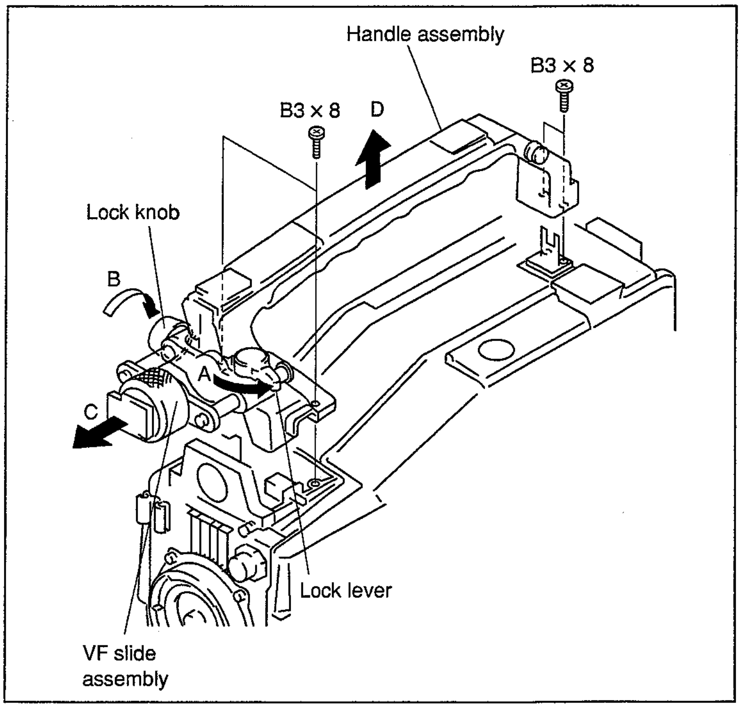
   Be careful not to lose the LP shield plate.


Precision screw
P2.6 × 5
Washer
Rear cover assembly
LP shield plate
LP-114 board
Drop protection (SW) (washer)
Drop protection (TALLY)
CN116
Precision screws
P1.4 × 3.5

4. Install the new LP-114 board by reversing the steps of removal.

6-22. SW-1030 Board Replacement

1. Remove the LP-114 board.
   (Refer to Section 6-21.)
2. Rotate lock lever in the direction of arrow A to unlock it.
3. Rotate lock knob in the direction of arrow B to unlock it. Slide the VF slide assembly in the direction of arrow C.
4. Remove the four screws and remove the handle assembly in the direction of arrow D.


Handle assembly
B3 x 8
B3 x 8
D
Lock knob
B
A
C
Lock lever
VF slide assembly

5. Disconnect the harnesses from the connectors (CN1, CN121) on the SW-1030 board.
6. Remove the two precision screws (P2 × 4) and remove the SW-1030 board assembly in the direction of the arrow.

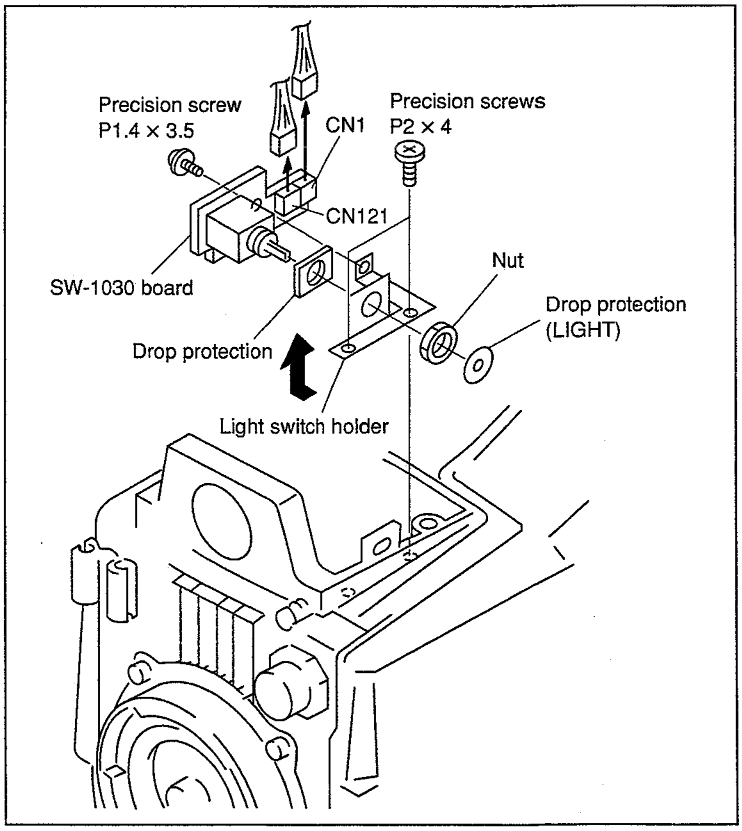
   Note

   Be careful not to lose the drop protection (LIGHT).

7. Remove the precision screw (P1.4 × 3.5) and nut. Remove the SW-1030 board from the light switch holder.

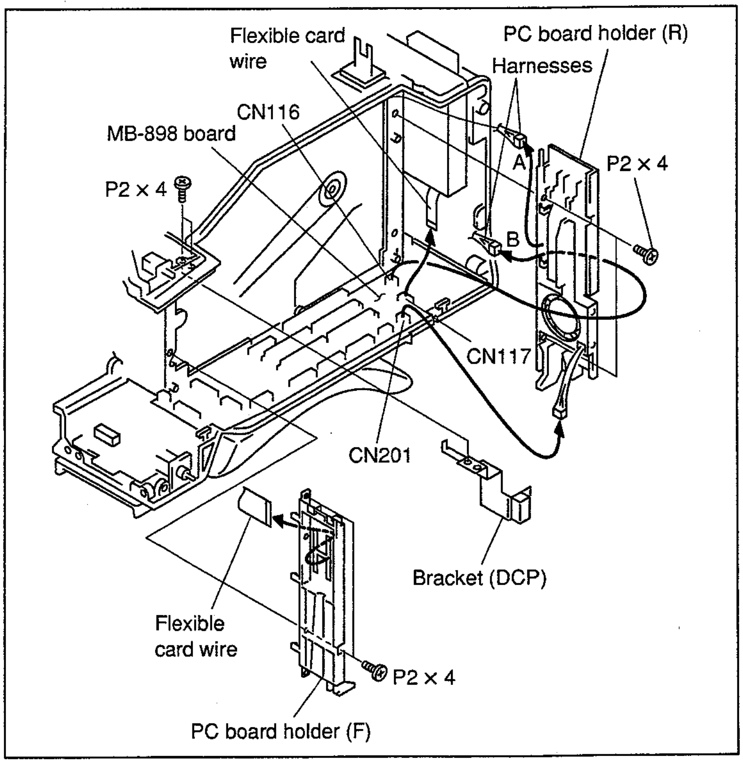
   Note

   Be careful not to lose the drop protection.


Precision screw
P1.4 x 3.5
CN1
Precision screws
P2 x 4
CN121
Nut
SW-1030 board
Drop protection
(LIGHT)
Drop protection
Light switch holder

8. Install the new SW-1030 board by reversing the steps of removal.

6-23. MB-898 Board Replacement



1. Open the inside panel assembly. (Refer to Section 1-5.)
2. Remove the connector box. (Refer to Section 1-6.)
3. Remove the plug-in boards. (Refer to Section 1-7.)
4. Remove the front panel. (Refer to Section 6-1-1.)
5. Remove the DC-DC converter. (Refer to Section 6-7.)
6. Remove the flexible board retainer. (Refer to Section 6-8-2.)
7. Remove the inside panel. (Refer to Section 6-11.)
8. Remove the CCM-45 board. (Refer to Section 6-16.)
9. Remove the PS-595 board. (Refer to Section 6-17.)
10. Remove the IF-797 board and the HN-227 board. (Refer to Section 6-19.)
11. Remove the SS-92 board. (Refer to Section 6-20.)
12. Remove the LP-114 board. (Refer to Section 6-21.)
13. Remove the handle assembly. (Refer to Section 6-22.)
14. Disconnect the harness and the flexible card wire from the connectors (CN117, CN201) on the MB-898 board.

    Note

    Life of flexible card wire will be significantly shortened if it is folded. Be very careful not to fold the flexible card wire.

15. Remove the two screws from the PC board holder (R). While removing the PC board holder (R), disconnect the harness A and the harness B from the PC board holder (R).
16. Remove the two screws from the bracket (DCP), and remove the bracket (DCP).
17. Disconnect the flexible card wire from the PC board holder (F).
18. Remove the two screws from the PC board holder (F) and remove the PC board holder (F).

19. Disconnect the harness from the coating lead pin and remove the connectors (CN114, CN115) from the MB-898 board.
20. Disconnect the harness and the flexible card wire from the connectors (CN101, CN120, CN121) on the MB-898 board.

    Note

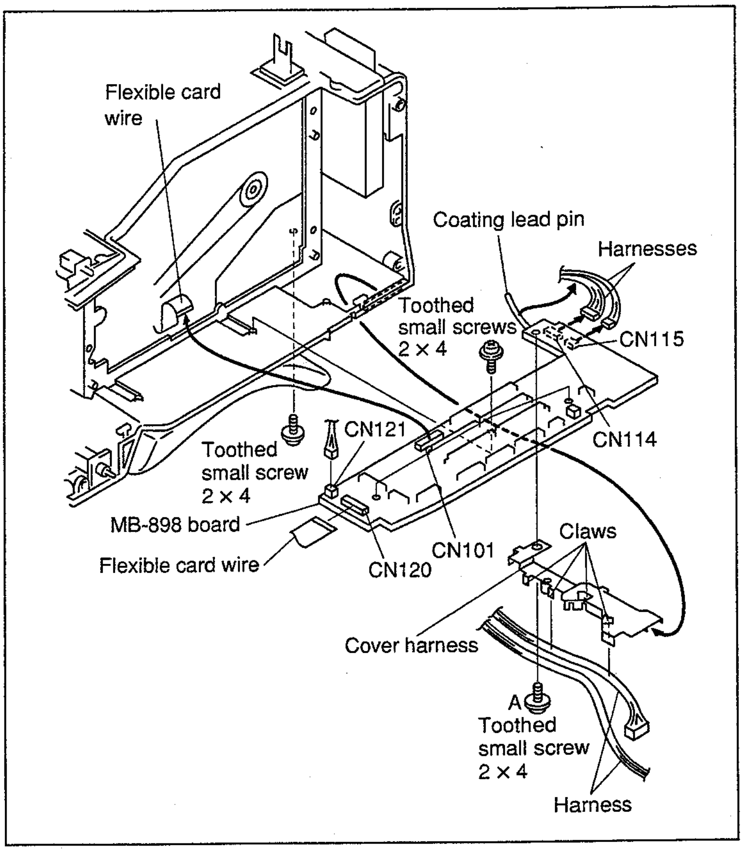
    Life of flexible card wire will be significantly shortened if it is folded. Be very careful not to fold the flexible card wire.

21. Disconnect the two harnesses from the four claws of the harness cover. Then remove the toothed small screw A and remove the harness cover.

    Note

    Depending on the time of production at the factory, there are sets that do not use the harness cover.

22. Remove the three toothed small screws (2 × 4) and remove the MB-898 board.


Flexible card wire
Coating lead pin
Harnesses
Toothed small screws 2 × 4
CN115
CN121
CN114
Toothed small screw 2 × 4
MB-898 board
Flexible card wire
CN120
CN101
Claws
Cover harness
A
Toothed small screw 2 × 4
Harness

23. Install the new MB-898 board by reversing the steps of removal.

6-24. Circuit Boards of the Mechanical Deck Assembly Replacement

Note

For replacement of the MDC-13A board, refer to "7-36. MDC-13A Board Replacement".

6-24-1. MDR-14 Board Replacement

1. Remove the mechanical deck assembly. (Refer to Section 1-15-10.)

   Note

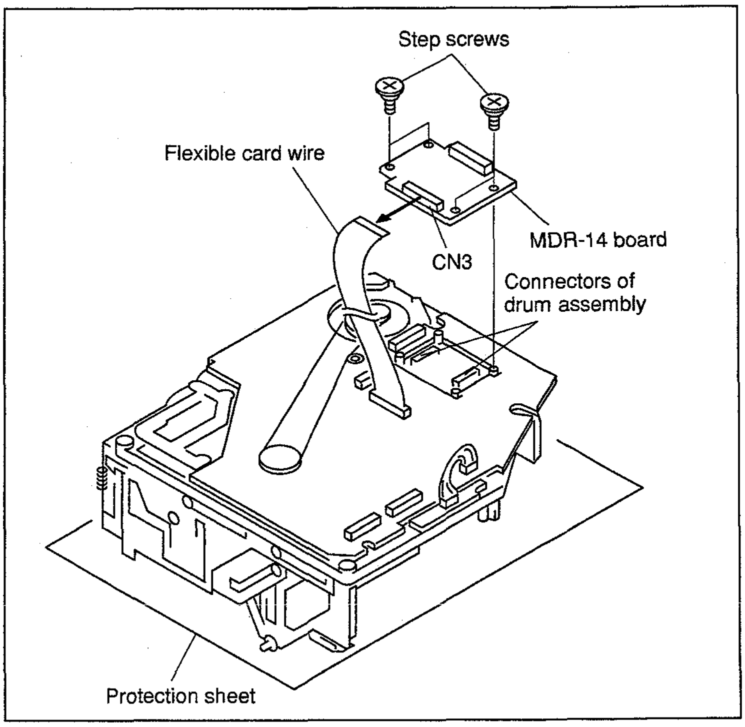
   When the mechanical deck assembly is going to be removed for maintenance, place a protection sheet underneath the mechanical deck assembly beforehand.

2. Disconnect the flexible card wire from the connector (CN3) on the MDR-14 board.

   Note

   Life of flexible card wire will be significantly shortened if it is folded. Be very careful not to fold the flexible card wire.

3. Remove the four step screws. While removing the connector coming from the drum assembly, remove the MDR-14 board.
4. Install the new MDR-14 board by reversing the steps of removal.



Adjustment after Replacement

Drum Phase Adjustment (Refer to Section 10-4-4.)

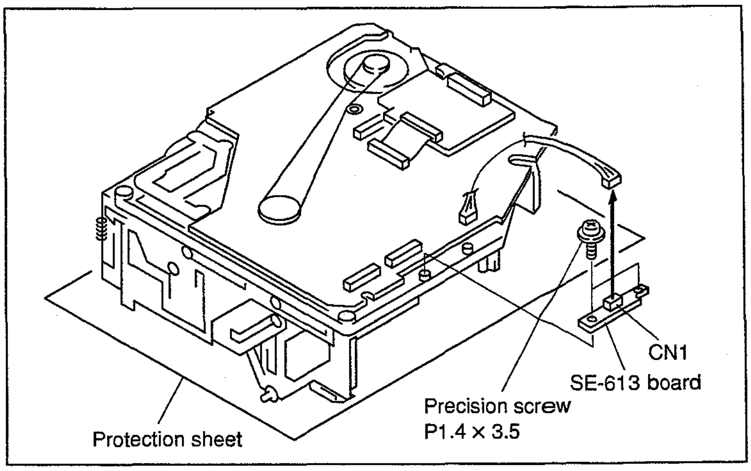
6-24-2. SE-613 Board Replacement

1. Remove the mechanical deck assembly. (Refer to Section 1-15-10.)

   Note

   When the mechanical deck assembly is going to be removed for maintenance, place a protection sheet underneath the mechanical deck assembly beforehand.

2. Disconnect the harness from the connector (CN1) on the SE-613 board.
3. Remove the two precision screws and remove the SE-613 board.
4. Install the new SE-613 board by reversing the steps of removal.



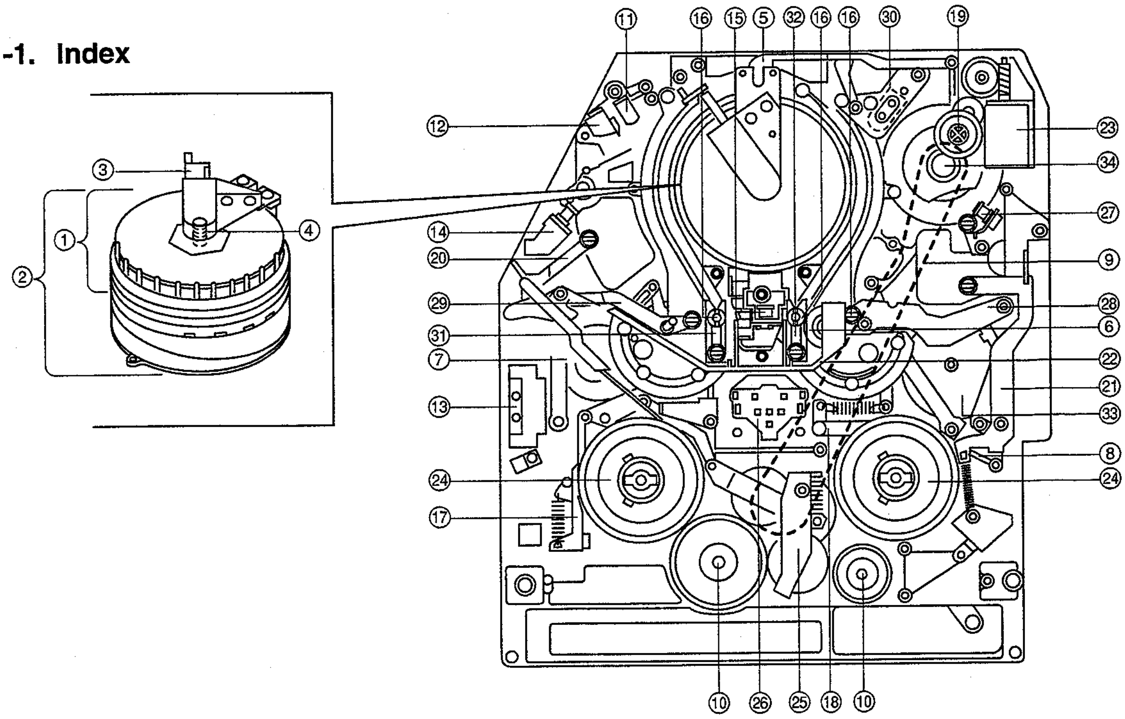
Section 7
Part Replacement of Mechanical Deck Assembly

7-1. General Information on Mechanical Part Replacement

Note

The mechanical parts that are shown in this Section can be removed and replaced directly from the mechanical deck assembly unless otherwise specified. The mechanical frame is omitted and not shown in the illustrations in this Section

7-1-1. Index



No.	Part name	Section
1	Upper Drum Assembly	7-2
2	Drum Assembly	7-3
3	Brush assembly for Slip Ring	7-4
4	Slip Ring Assembly	7-5
5	AHC Roller Assembly for Video Head	7-6
6	Pinch Roller Assembly	7-7
7	S-Tension Regulator Band Assembly	7-8
8	T-Tension Regulator Band Assembly	7-9
9	Timing Belt	7-10
10	S/T Idler Assembly	7-11
11	CTL Head	7-12
12	FE Head	7-13
13	Holder Assembly Sensor (REC)	7-14
14	End Sensor Assembly	7-15
15	Full Top Sensor Assembly	7-16
16	S1, T1, T3 Tape Guide	7-17
17	(S) Soft Brake Assembly	7-18
18	T Soft Brake	7-19

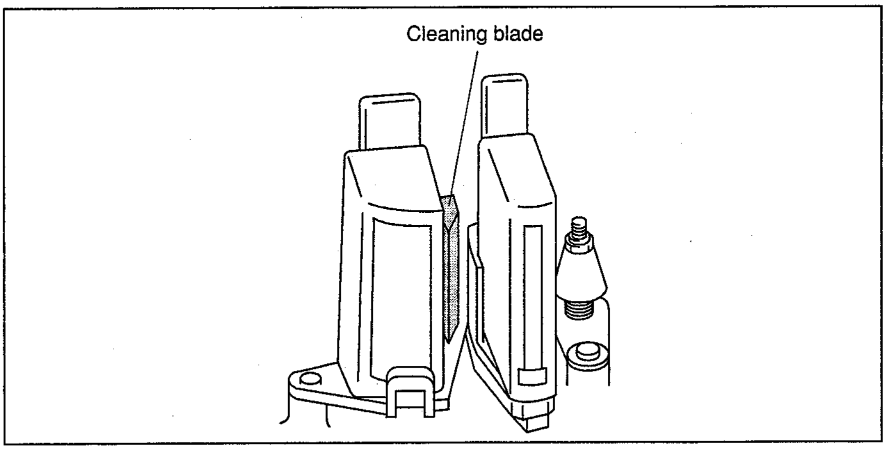
No.	Part name	Section
19	Manual Eject Assembly	7-20
20	S-Tension Regulator Assembly	7-21
21	T-Tension Regulator Assembly	7-22
22	Cassette Stopper	7-23
23	Gear Block Assembly	7-24
24	S/T Reel Table Assembly	7-25
25	Reel Drive Gear Assembly	7-26
26	Holder Assembly Sensor (ID)	7-27
27	Top Sensor Assembly	7-28
28	Pinch Arm Assembly	7-29
29	Threading Arm Assembly	7-30
30	TC Head Assembly	7-31
31	S Slider Assembly	7-32
32	T Slider Assembly	7-33
33	Cam Gear Assembly	7-34
34	Capstan Motor	7-37
	Mechanical Deck Assembly	7-35
	MDC-13A Board	7-36

7-1-2. Notes

1. Notes on tape cleaner

WARNING

The tape cleaner located at the input head block has a cleaning blade which is sharp and can cut your hands. Never touch the cleaning blade with bare hands, and be careful not to cut your hands when cleaning, replacing parts nearby and making adjustments.



2. Cleaning the tools and fixtures

Be sure to clean the surface of tools and fixtures before using them.

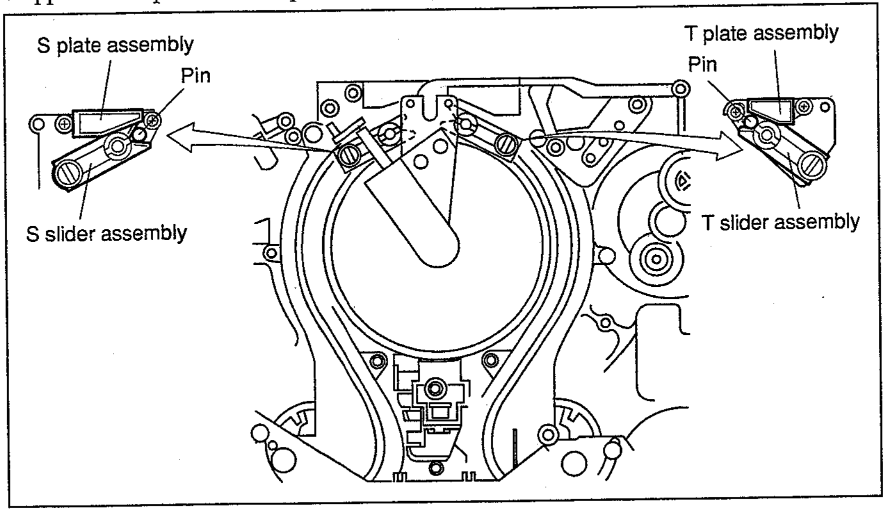
- Cleaning cloth : 3-184-527-01
- Cleaning fluid : 9-919-573-01

Handle tools and fixtures carefully so as not to scratch them.
Correct adjustments cannot be made with damaged tools and fixtures.

7-1-3. Threading-End State and Unthreading-End State

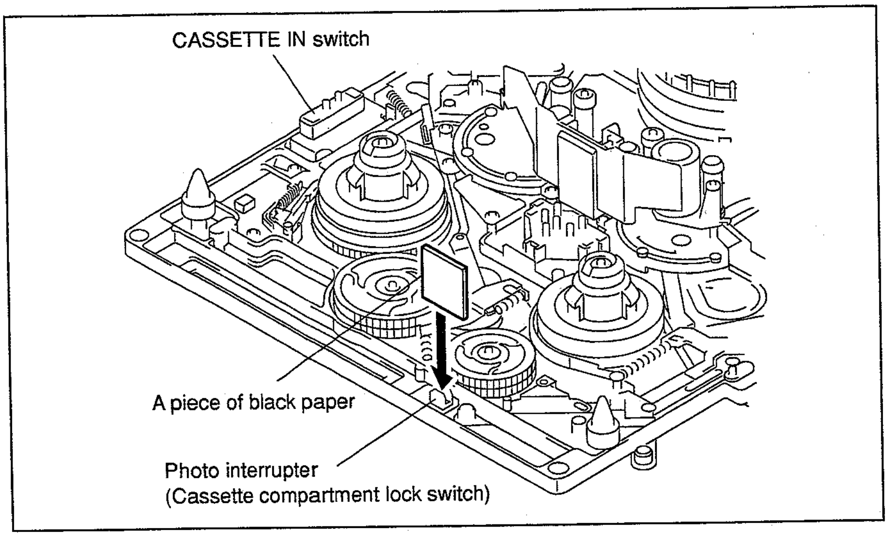
1. Threading-end state

Threading-end state means the mechanical state in which the S slider assembly and T slider assembly have moved to both sides of the drum so that they reached and stopped at the pins of the S plate assembly and the T plate assembly respectively.


S plate assembly
Pin
S slider assembly
T plate assembly
Pin
T slider assembly

(1) How to establish the threading-end state using a cassette tape
  (a) Insert a cassette tape into the cassette compartment.
  (b) Close the front lid.

(2) How to establish the threading-end state without using a cassette tape
  (a) Move the cassette compartment to its down position.
  (If a cassette compartment is not installed, insert a piece of black paper into the photo interrupter of the cassette compartment lock switch on the MDC-13A board to disable the photo interrupter.)
  (b) Set the SLACK MUTE to ON on the adjustment mode menu A40 : PATH MODE SEL. (Refer to Section 11-3-5.)
  (c) When the above state is established, press the CASSETTE IN switch for about 1 second.


CASSETTE IN switch
A piece of black paper
Photo interrupter
(Cassette compartment lock switch)

(3) How to establish the threading-end state manually
  Rotate the manual eject assembly manually by hand. (Refer to Section 7-1-4.)

2. Unthreading-end state

Unthreading-end state means the mechanical state in which the S slider assembly and T slider assembly have moved from the S plate assembly and the T plate assembly toward the reel tables respectively, and have come to a complete stop. This is also called the STANDBY state.

(1) How to establish the unthreading-end state
Press the EJECT button.

(2) How to establish the unthreading-end state manually
Rotate the manual eject assembly manually by hand. (Refer to Section 7-1-4.)

Note

For the procedure to establish the unthreading-end state with a cassette tape inserted, refer to Section 1-11.

7-1-4. How To Eject a Cassette Tape Manually

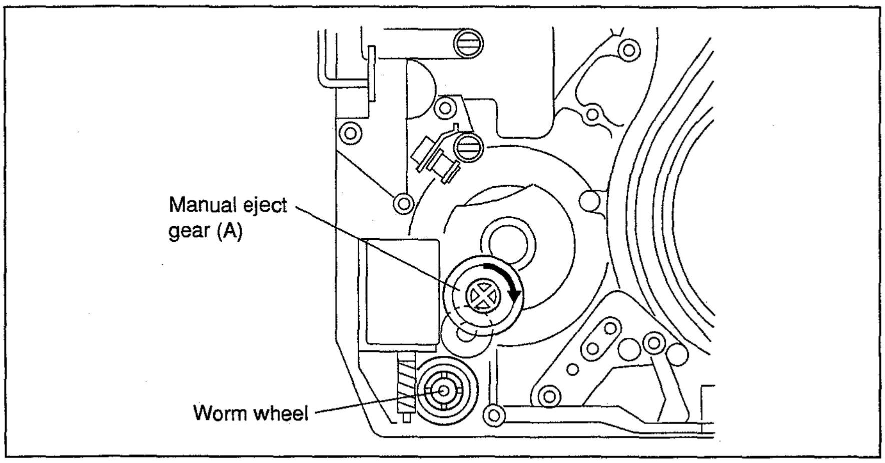
The threading-end state and the unthreading-end state can be established by rotating the manual eject gear (A) or the worm wheel of the manual eject assembly by hand even when the main power is turned off.

Notes

- Do not rotate the respective gears excessively more than required, otherwise the parts of the unit may be damaged.
- Use an Phillips screwdriver for size M3 to rotate the worm wheel.
  Phillips screwdriver (for M3) : 7-700-749-04

Note

The worm wheel is provided to allow the engineer to fix problems in case of tape slack, etc.



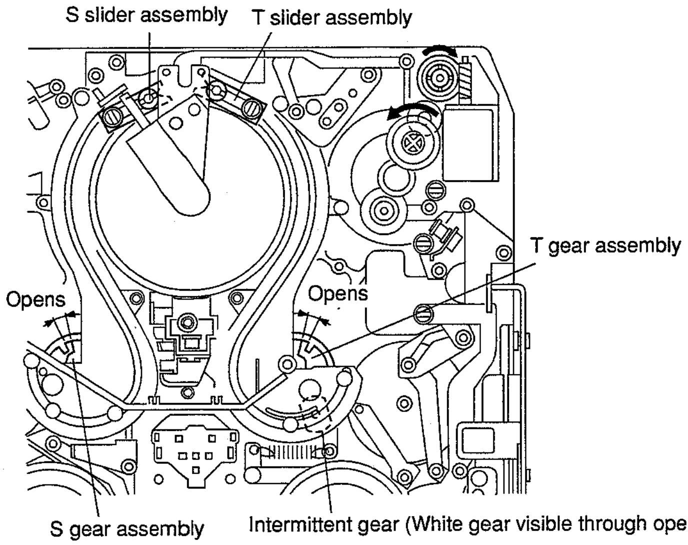
Threading-end

The mechanism can be driven in the threading mode manually until it reaches the threading-end state by rotating it counter-clockwise while pressing down the manual eject gear (A). Alternatively, rotate the worm wheel clockwise manually by using the Phillips screwdriver.

Stop rotating the mechanism manually when the intermittent gear stops rotating and both the S gear assembly and the T gear assembly have opened the spaces shown by the arrow in the illustration.

Note

If the mechanism is rotated further, the parts of the unit may be damaged.


S slider assembly
T slider assembly
T gear assembly
Opens
Opens
S gear assembly
Intermittent gear (White gear visible through opening of the T rail)

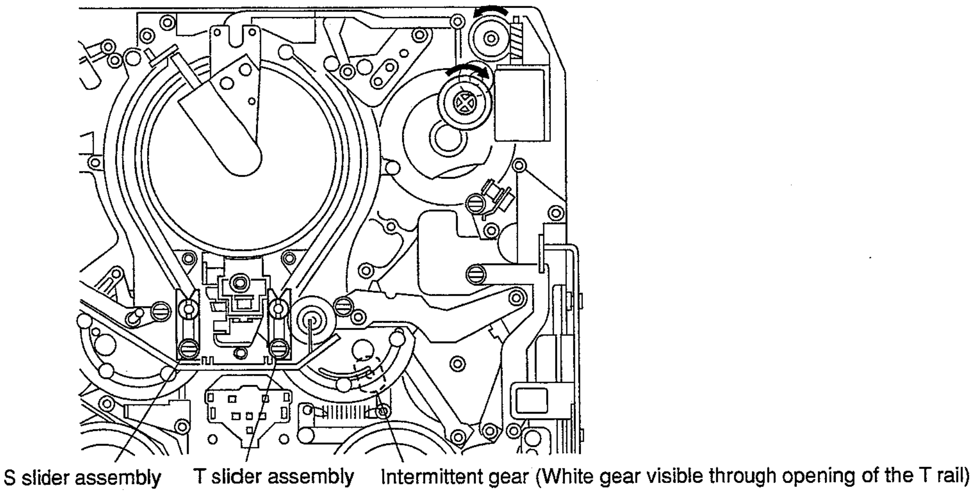
Unthreading-end

The mechanism can be driven in the unthreading mode manually until it reaches the unthreading-end state by rotating it clockwise while pressing down the manual eject gear (A). Alternatively, rotate the worm wheel clockwise manually by using the Phillips screwdriver.

When the cassette compartment has moved to the up state.
When the cassette compartment is not installed.
When the intermittent gear stops rotating and both the S slider assembly and T slider assembly have reached the specified positions as shown in the illustration.

Note

If the mechanism is rotated further, the parts of the unit may be damaged.

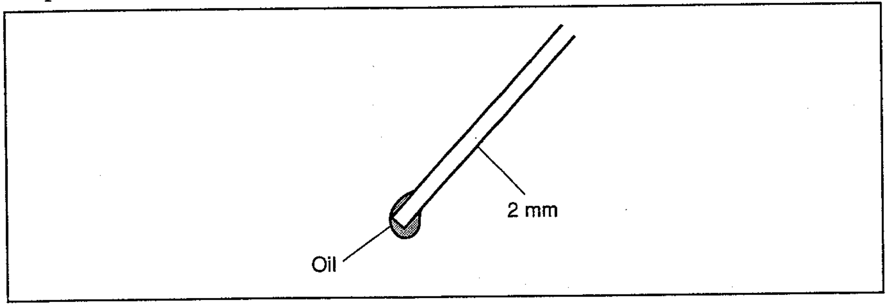

S slider assembly
T slider assembly
Intermittent gear (White gear visible through opening of the T rail)

7-1-5. About Oil and Grease

Be sure to use the specified oil and grease.
If the different oil or grease used, major malfunction may cause due to the differences in viscosity and ingredients.
If the oil and grease used which mixed with dust, major malfunction may cause.
Be sure to use the following oil and grease.

Oil:	7-661-018-18
Grease (SGL-601) :	7-651-000-10
Grease (SGL-801) :	7-651-000-11

- A drop of oil defines as follows: About the amount will adhere to the end of a stick (2 mm in diameter) as shown in the figure.
- Smear grease onto the surface of the part like a thin film.
  If grease smeared spread from the specified areas, be sure to wipe using a gauze or soft cloth.
- Apart from the specified areas never use the oil and grease.



7-1-6. Screw Tightening Torque and Washer

1. About screwdriver and screw tightening torque

This unit uses the screws of the two types.
Be sure to use the specified tools when loosening and tightening.
Be sure to use the torque screwdriver when tightening the screws, and tighten in the specified torque reading.

Torque screwdriver bit (for M1.4) : J-6325-110-A
Torque screwdriver bit (for M2) : J-6325-380-A
Hexagon bit (across 1.5) : J-6326-120-A
Torque screwdriver (for 3 kg) : J-6325-400-A

Tightening torque
For M1.4 (+) screw : 10×10^{-2} N•m (1.0 kgf•cm)
For M2 (+) screw : 20×10^{-2} N•m (2.0 kgf•cm)
For hexagon screw : 30×10^{-2} N•m (3.0 kgf•cm)

Note

This unit uses the small size screws. When removing or attaching, the screw may fall in the unit. To prevent from the falling, it recommends that the bit of the screwdriver magnetizes.

2. About stop washer

Never re-use the pre-used stop washers.
When attaching the part, be sure to use the new stop washer.

Stop washer : 3-559-408-11

How to remove stop washer

(a) Remove the stop washer using a pair of small nippers or tweezers.

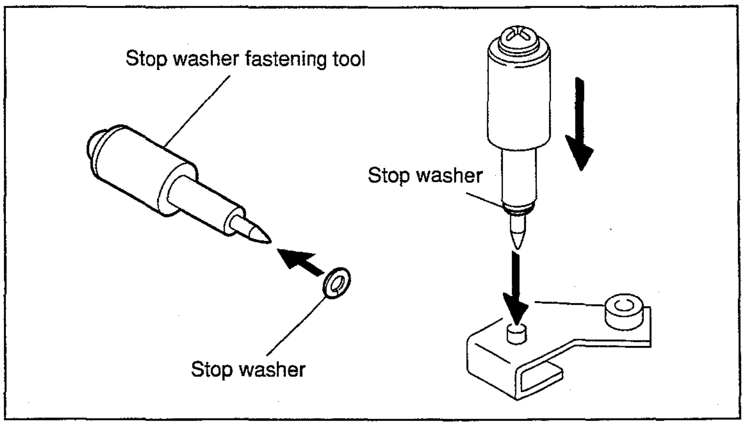
Notes

- Take care not to fall in the unit.
- Take care not to touch the tool against the other parts (especially the drum).

How to install stop washer

When attaching, it recommends to use the following tool.
Stop washer fastening tool : J-6323-530-A

(a) Put the stop washer to the top of the stop washer fastening tool.
(b) Put the top of the tool on the top of the shaft in an upright position.
(c) Press down the tool and attach the stop washer to the shaft.



7-2. Upper Drum Assembly Replacement

Overview

Replacement

Removing the cleaning assembly
Removing connector from brush assembly
Removing the full top sensor assembly
Removing the drum assembly
Installing the drum assembly to drum install plate
Removing the brush cover
Removing the brush assembly
Removing the slip ring assembly
Removing the upper drum assembly
Cleaning the drum contact surface
Installing the upper drum assembly
Installing the upper drum eccentricity adjustment tool
Adjusting Upper drum eccentricity
Removing the upper drum eccentricity adjustment tool
Installing the slip ring assembly
Installing the brush assembly
Installing the brush cover
Removing the drum assembly from drum install plate
Cleaning the drum contact surface
Installing the drum assembly
Installing the full top sensor assembly
Installing the cleaning assembly
Connecting the connector to brush assembly
Cleaning the cleaning assembly and tape running surface

Adjustments after replacement

Tape run adjustment
Video tracking adjustment
CTL head height adjustment
CTL head position adjustment
TC head height adjustment
TC head position adjustment
Drum phase adjustment

Note

If rotary heads are worn out or broke, replace the entire upper drum assembly. The head chip cannot be replaced independently.

Basic Information

Apart from the periodic replacement time, the upper drum assembly needs to be replaced in the following cases.

- If a correct RF waveform cannot be obtained after the tracking adjustment.

Preparations

Preparation on unit's side

1. Check that the unit is in the unthreading-end state.
2. Turn the POWER switch to OFF.
3. Remove the front lid and the outside panel assembly. (Refer to Section 1-4.)

Preparation on tool's side

Remove the two screws that are supplied with the drum install plate. (Fig. 1)
Install the drum install plate to the boss of the flatness check tool with the two screws removed. (Fig. 2)

Note

The upper drum assembly can be replaced when the cassette compartment attaches to the unit.

Fig. 1

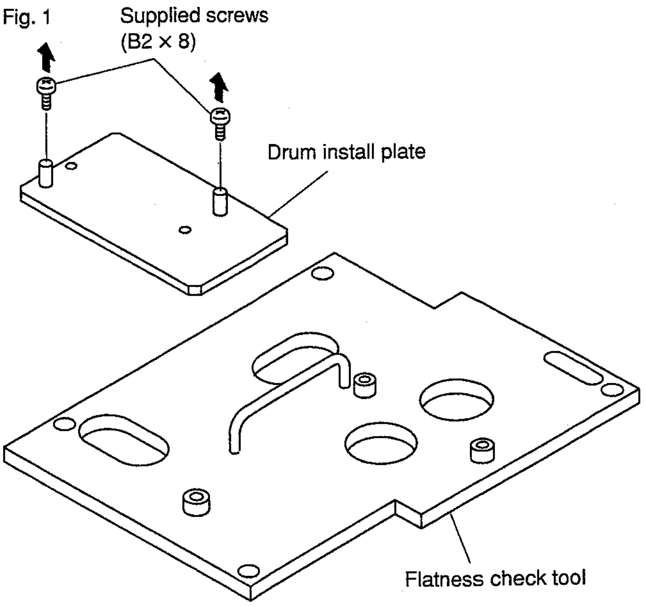
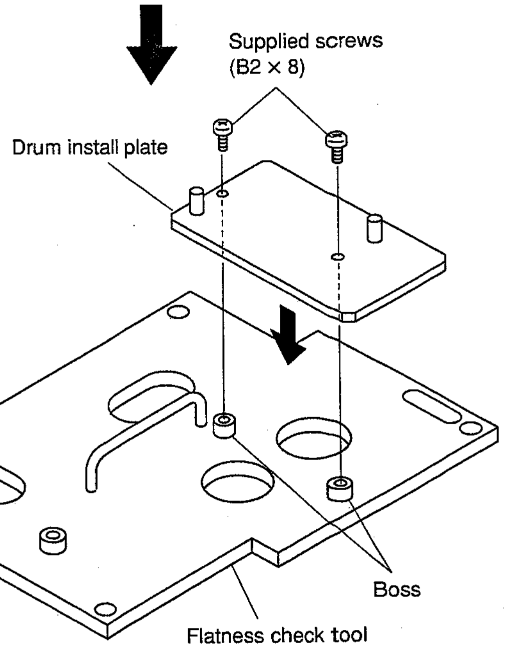

Supplied screws
(B2 × 8)
Drum install plate
Flatness check tool

Fig. 2


Supplied screws
(B2 × 8)
Drum install plate
Boss
Flatness check tool

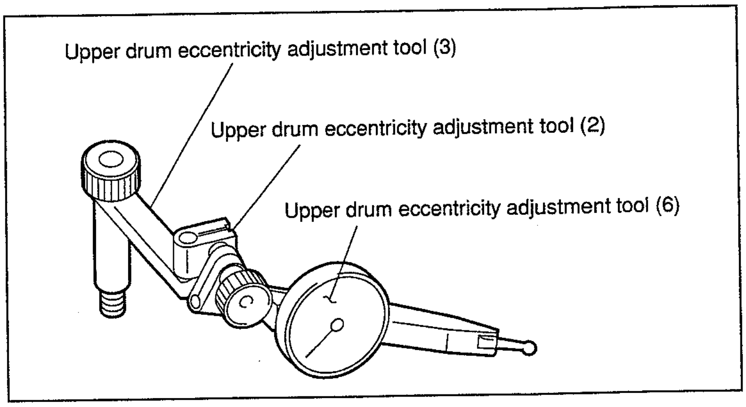
Tools

Torque screwdriver bit (for M2) :	J-6325-380-A
Torque screwdriver bit (for M1.4) :	J-6325-110-A
Hexagon bit (across 1.5) :	J-6326-120-A
Torque screwdriver (for 3 kg) :	J-6325-400-A
Upper drum eccentricity adjustment tool (3) :	J-6001-820-A
Upper drum eccentricity adjustment tool (2) :	J-6001-830-A
Upper drum eccentricity adjustment tool (6) :	J-6325-530-A
Flatness check tool :	J-6325-360-A
Drum install plate :	J-6531-110-A
Cleaning cloth:	3-184-527-01
Cleaning fluid:	9-919-573-01
Skewer	

Notes

(1) When attaching the upper drum assembly to the flange, tighten the screws with two steps of different torques as described below.
- First, tighten the screws with 10×10^{-2} N•m (1 kgf•cm).
- Second, tighten the screws with 25×10^{-2} N•m (2.5 kgf•cm) finally. To tighten the screws to the above torque reading, attach the hexagon bit to the torque screwdriver and set the torque to 9.8×10^{-2} N•m (1 kgf•cm).

(2) Assemble the upper drum eccentricity adjustment tools as shown.


Upper drum eccentricity adjustment tool (3)
Upper drum eccentricity adjustment tool (2)
Upper drum eccentricity adjustment tool (6)

Removal

1. Removing the cleaning assembly

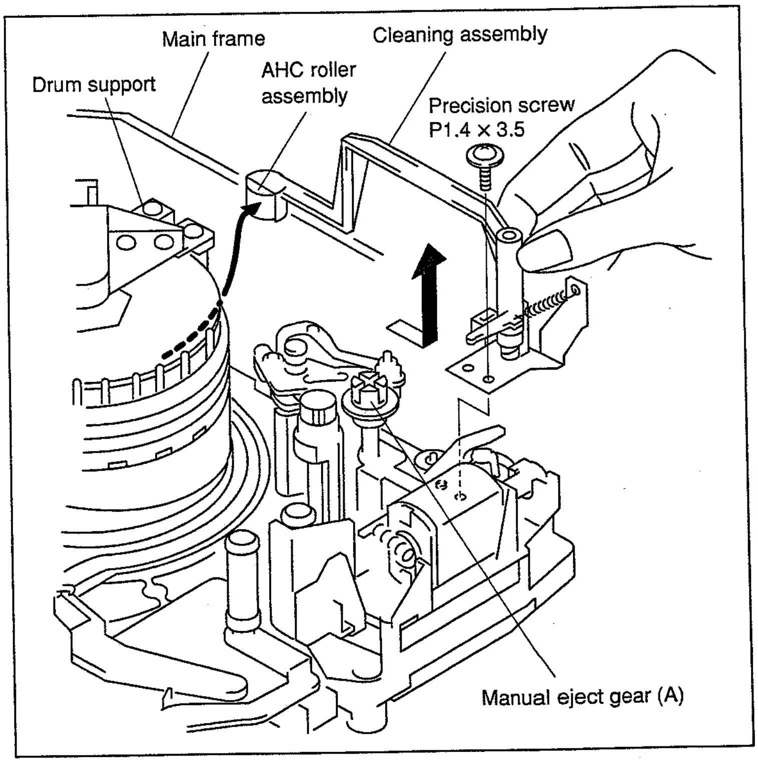
Setting mode :
Enter the unthreading-end state of the unit.

(1) Remove the precision screw and hold the specified position of the cleaning assembly as shown in the illustration, and raise it up exceeding the top of the manual eject gear (A).

(2) Remove the AHC roller assembly of the cleaning assembly between the drum support and main frame.

Note

When removing the cleaning assembly, be careful not to touch the upper drum assembly and drum assembly.


Main frame
Cleaning assembly
Drum support
AHC roller assembly
Precision screw P1.4 x 3.5
Manual eject gear (A)

2. Removing connector from brush assembly

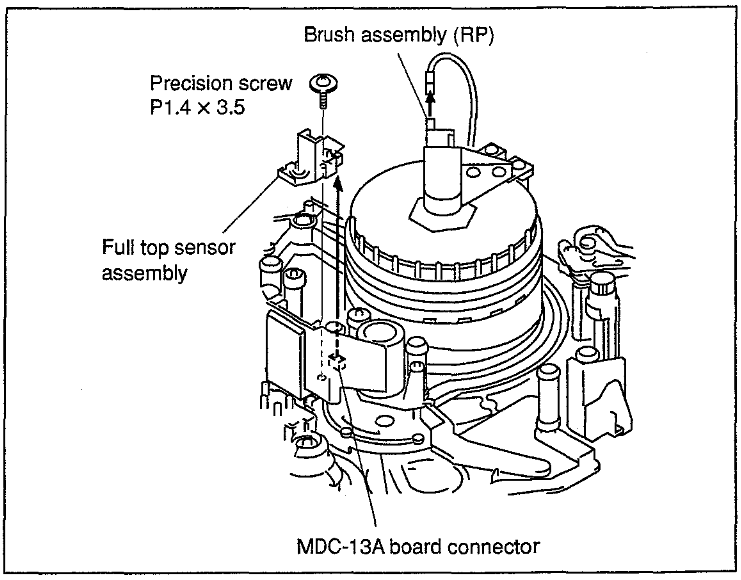
Remove the connector from the brush assembly.

3. Removing the full top sensor assembly

Remove the precision screw. While removing the connector on the MDC-13A board, remove the full top sensor assembly.

Note

When removing the full top sensor assembly, be very careful not to touch the drum.


Brush assembly (RP)
Precision screw
P1.4 × 3.5
Full top sensor
assembly
MDC-13A board connector

4. Removing the drum assembly

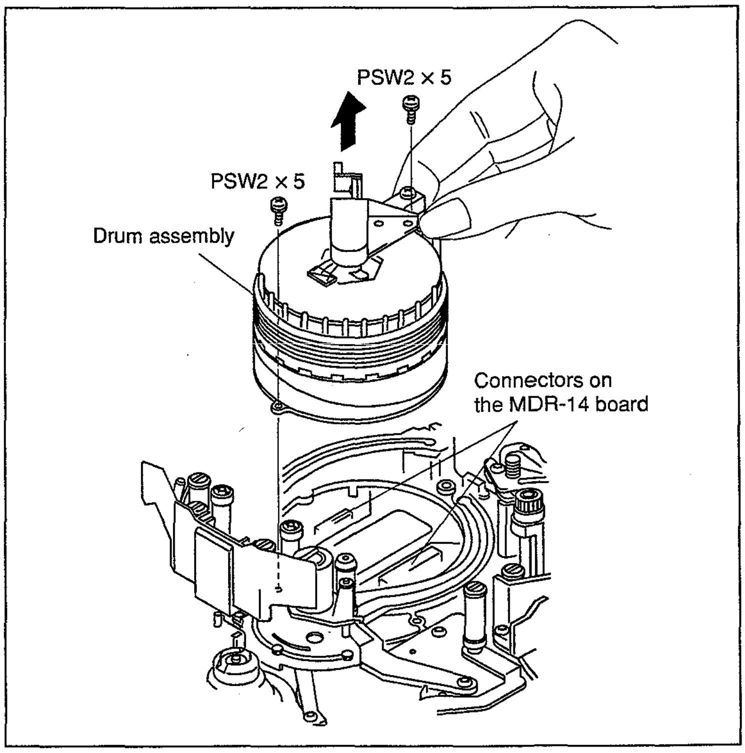
Note

The drum assembly is fixed by the two screws. The drum assembly is connected with the MDR-14 board on the rear of the mechanical deck with connector. Due to these connections, do not put excessive force to the dum assembly even after the two screws are removed.

Note

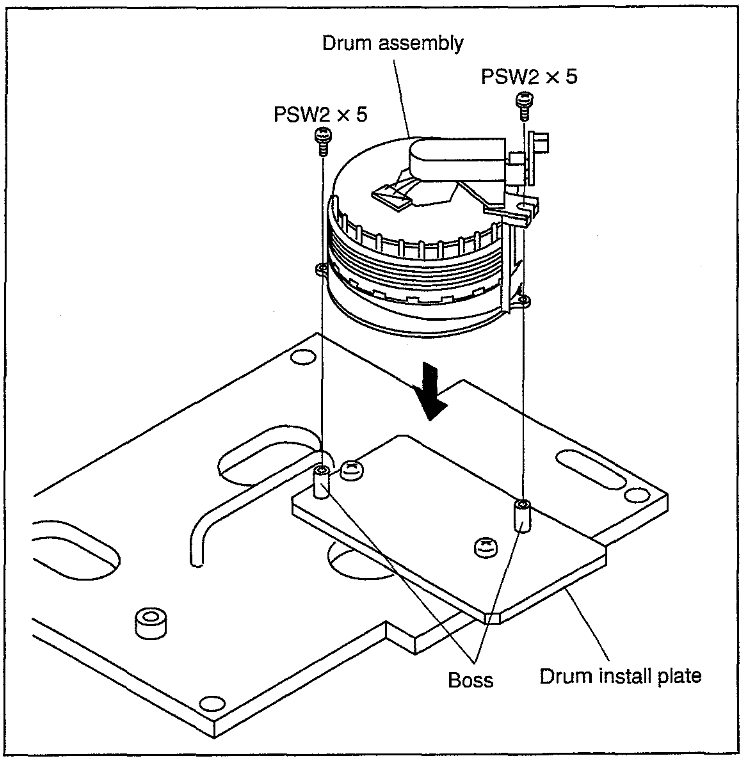
When removing the drum assembly, be careful not to touch the CTL head, TC head and nearby tape guides.

Remove the two screws. Hold the upper part of the brush support. While loosening the connector on the MDR-14 board, remove the drum assembly.


PSW2 × 5
PSW2 × 5
Drum assembly
Connectors on
the MDR-14 board

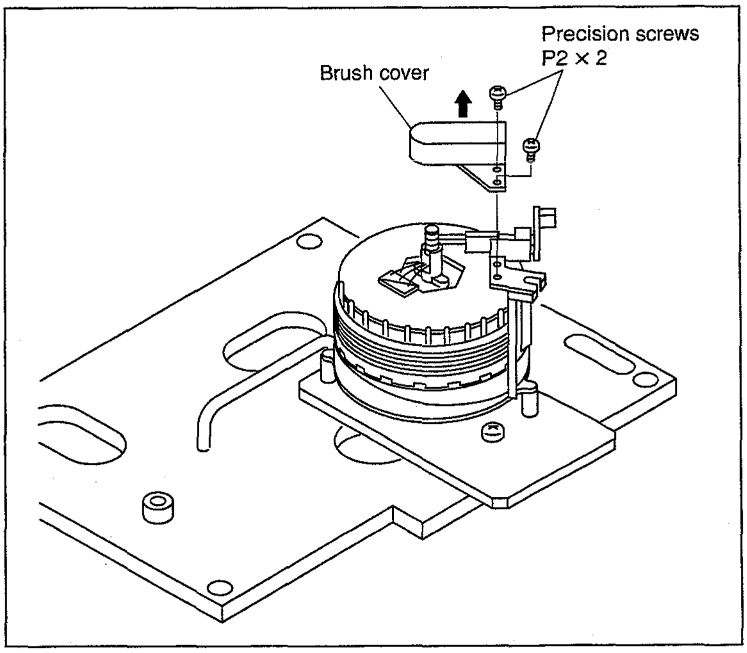
5. Installing the drum assembly to drum install plate

Install the drum assembly to the boss of the drum install plate with the screws that are removed in preparation step.


Drum assembly
PSW2 x 5
PSW2 x 5
Boss
Drum install plate

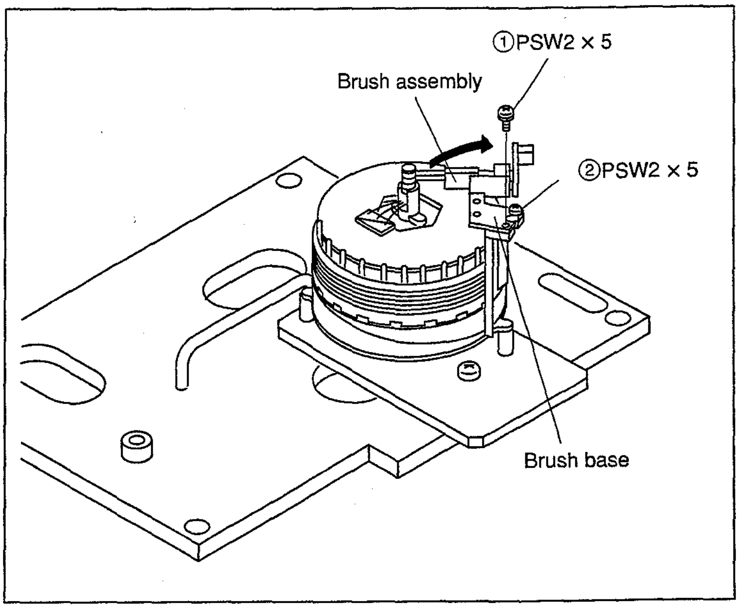
6. Removing the brush cover

Remove the two precision screws and remove the brush cover in the direction of the arrow.


Precision screws
P2 x 2
Brush cover

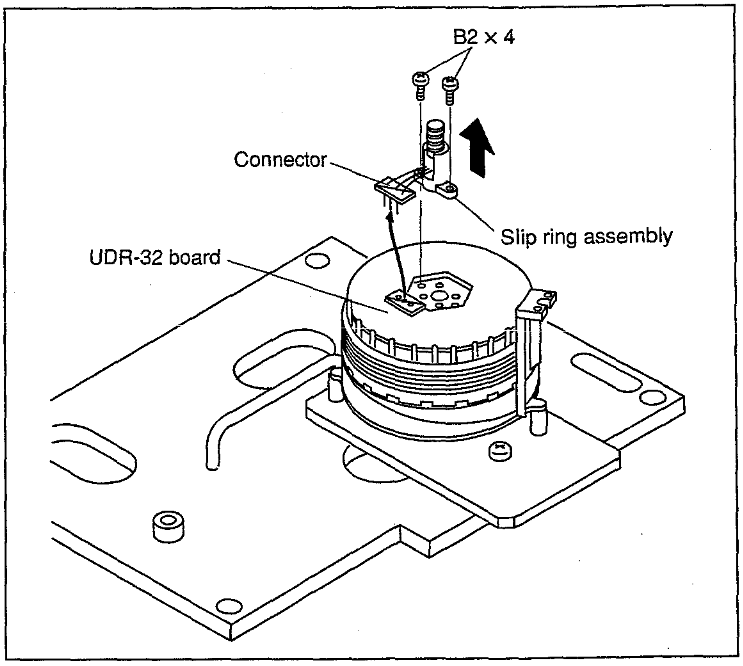
7. Removing the brush assembly

(1) Among the two screws that are fixing the brush base, remove the screw that is shown as ① by the illustration.
(2) Loosen the screw ② and move the brush base in the direction of the arrow.
(3) Remove the screw ② and remove the brush assembly.


①PSW2 x 5
Brush assembly
②PSW2 x 5
Brush base

8. Removing the slip ring assembly

(1) Remove the two screws fixing the slip ring assembly.
(2) While removing the connector on the UDR-32 board, remove the slip ring assembly together.


B2 x 4
Connector
Slip ring assembly
UDR-32 board

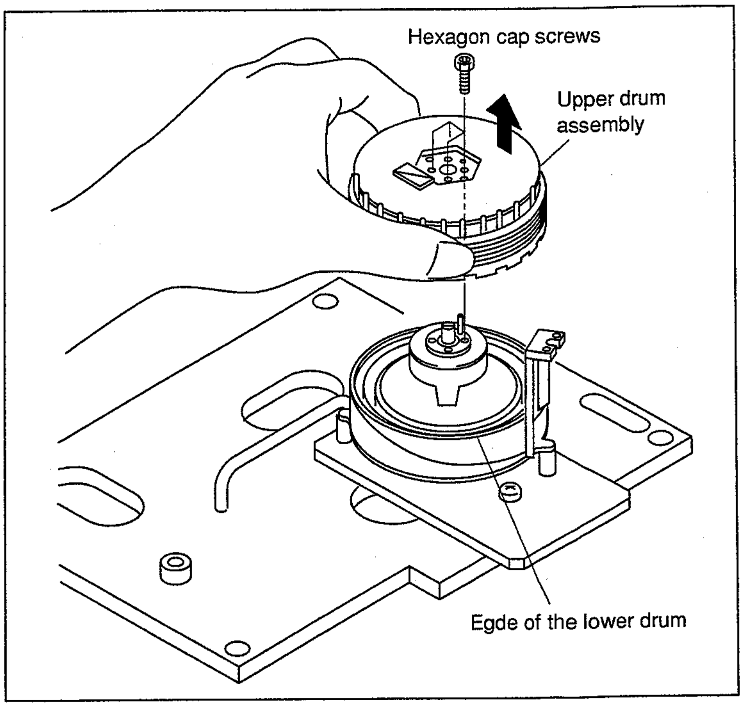
9. Removing the upper drum assembly

(1) Remove the four hexagon cap screws securing the upper drum assembly.

(2) Remove the upper drum assembly in the direction of the arrow.

Note

After the upper drum assembly is removed, be careful not to touch the upper edge of the lower drum.


Hexagon cap screws
Upper drum assembly
Egde of the lower drum

Installation

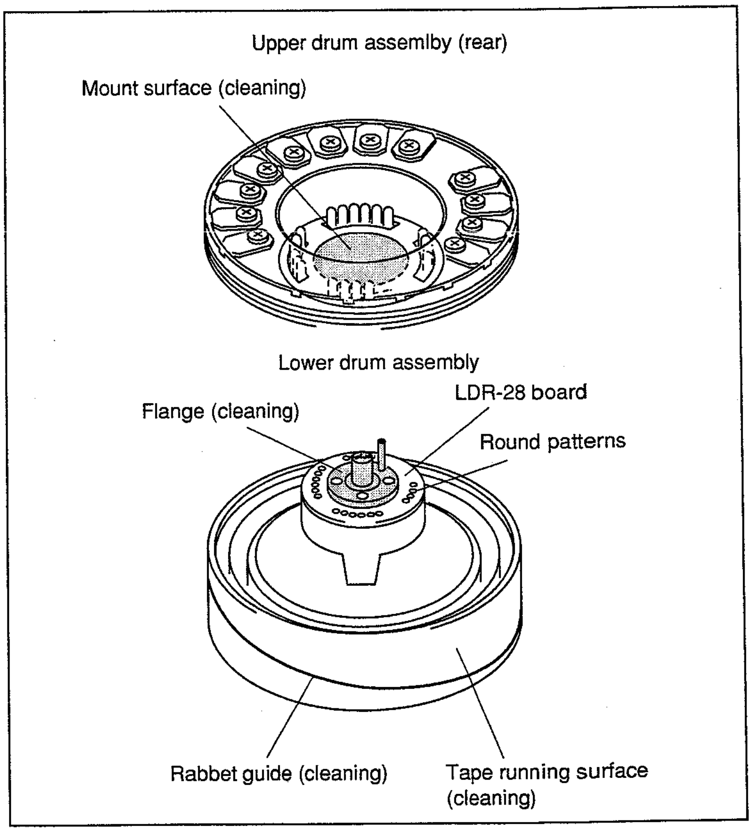
10. Cleaning the drum contact surface

(1) Clean the following places using a cleaning cloth moistened with cleaning fluid.
- Flange of the lower drum assembly (Upper drum mount surface)
- Tape running surface and rabbet guide of the lower drum assembly
- Mount surface on the rear of the new upper drum assembly

(2) Wipe the 20 round patterns of the LDR-28 board in the lower drum with dry cloth.

Note

Never clean the round patterns with anything moistened with cleaning cloth.


Upper drum assemlby (rear)
Mount surface (cleaning)
Lower drum assembly
LDR-28 board
Flange (cleaning)
Round patterns
Rabbet guide (cleaning)
Tape running surface (cleaning)

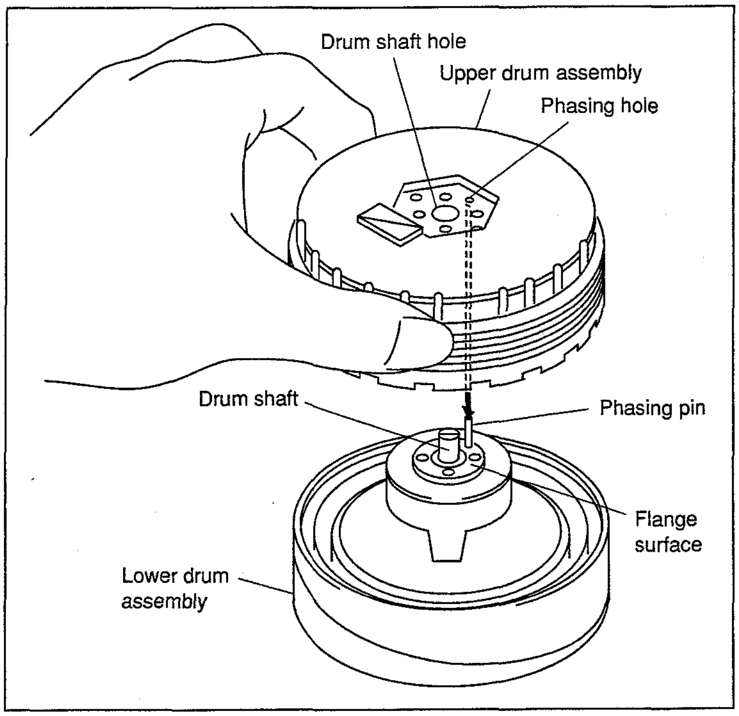
11. Installing the upper drum assembly

(1) Hold the top of the new upper drum assembly with hand. Align the phasing hole of the upper drum assembly with the phasing pin of the lower drum.

(2) Insert the phasing hole and the drum shaft hole of the upper drum assembly into the phasing pin of the drum shaft of the lower drum very gently and carefully. Place the upper drum assembly on the flange surface the lower drum without any slant angle.

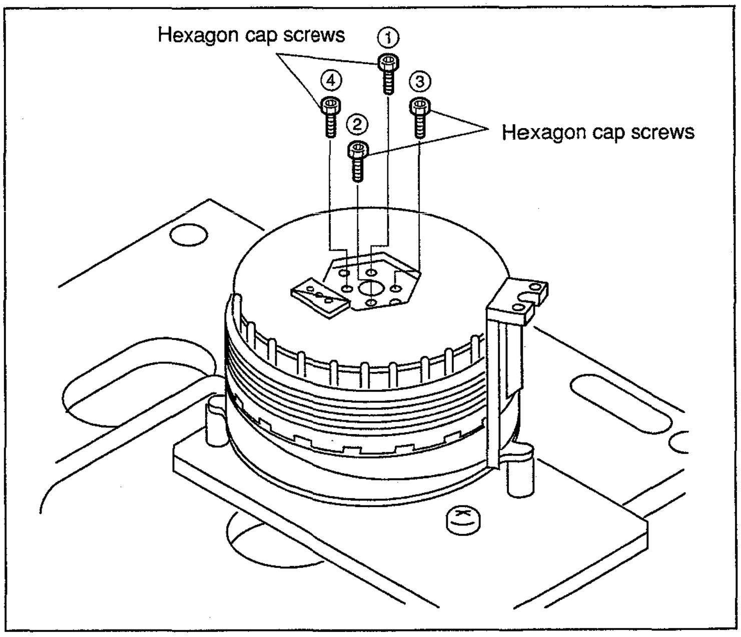
Note

When installing the upper drum assembly, be careful not to touch the video head against brush support and other mechanism.


Drum shaft hole
Upper drum assembly
Phasing hole
Drum shaft
Phasing pin
Flange surface
Lower drum assembly

(3) Insert the four hexagon cap screws into the mount holes that are removed when removing the upper drum assembly with a pair of tweezers.

(4) Tighten the hexagon cap screws tentatively with hexagon bit, one bolt after another in the order as shown in the illustration so that they are tightened with equal strength.


Hexagon cap screws
①
④
③
②
Hexagon cap screws

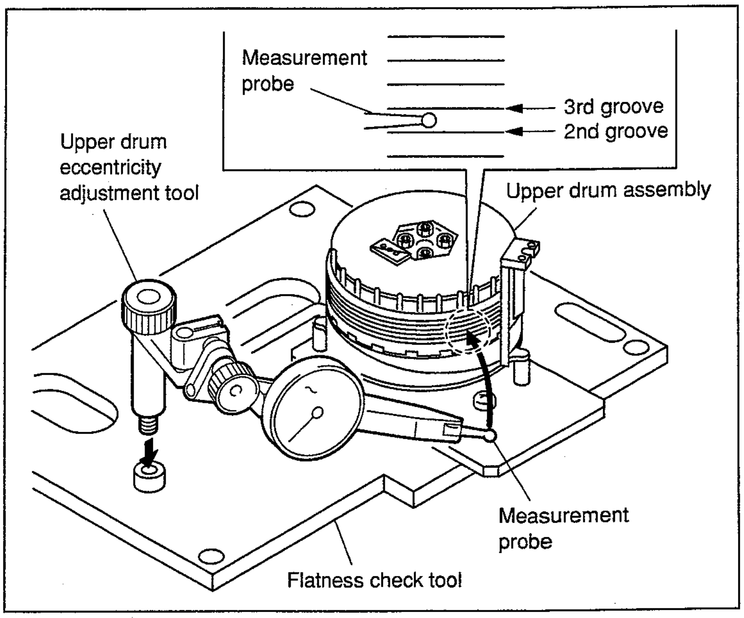
12. Installing the upper drum eccentricity adjustment tool

(1) Attach the upper drum eccentricity adjustment tool that is assembled at the beginning of this Section (see **Note** of Tools), to the flatness check tool.

(2) Adjust the upper drum eccentricity adjustment tool so that the probe at the top of the upper drum eccentricity adjustment tool (6) is positioned between the 2nd and the 3rd grooves from the bottom of the outside surface on the upper drum assembly.

Note

Be careful not to touch the measurement probe against the video head.



13. Adjusting upper drum eccentricity

(1) Slowly rotate the upper drum assembly counter-clockwise. Check that the eccentricity gauge reading meets the following specification of the gauge pointer deflection throughout the one full rotation of the upper drum assembly.
Specification : Within 3 µm

If the specification does not meet, repeat the following three steps of (a) to (c) and adjust until the specification meets.

(a) Slowly rotate the upper drum assembly counter-clockwise and check the maximum and minimum values of the gauge pointer deflection.

(b) Then rotate the upper drum to the position that gives the minimum deflection of the gauge pointer reading.

(c) Press the point that is 180 degree opposite of the measurement probe, of the upper drum in the direction of the arrow so that the gauge pointer reading is half way (1/2) between the maximum and minimum values of deflection.

Note

If the gauge pointer reading does not move even when the upper drum is pressed by finger, loosen the four hexagon cap screws slightly that secure the upper drum.
If the gauge pointer reading moves too easily when pressed, tighten the hexagon cap screws a little.

(2) Insert the torque screwdriver that is set to 10×10^{-2} N•m (1 kgf•cm), in the four holes on the board of the upper drum and tighten the four hexagon cap screws one bolt after another in the order as shown.

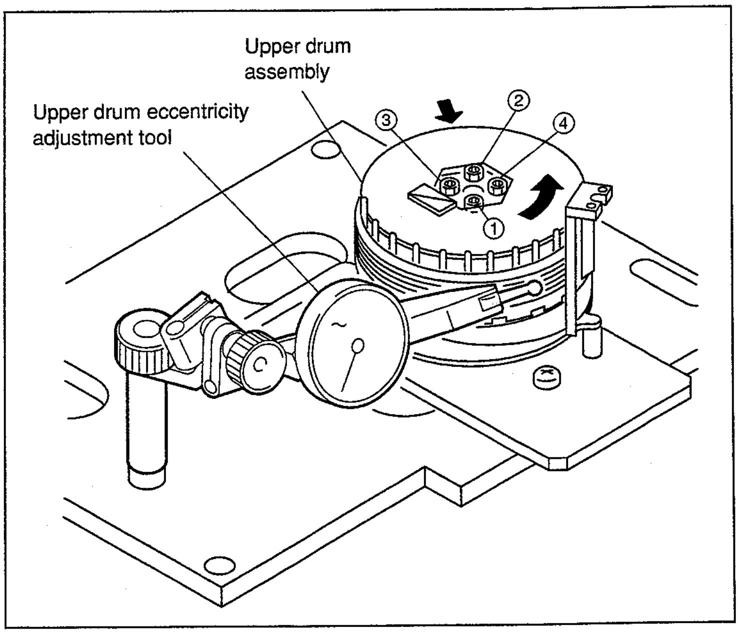
Note

When tightening the screws just after the eccentricity adjustment, the tightening torque value should be 10×10^{-2} N•m (1 kgf•cm).

(3) Set the torque screwdriver to 25×10^{-2} N•m (2.5 kgf•cm).

(4) Tighten the four hexagon cap screws in the same order as in step 2 with the torque screwdriver

(5) Re-check that the specification met.


Upper drum assembly
Upper drum eccentricity adjustment tool
③
②
④
①

14. Removing the upper drum eccentricity adjustment tool

Remove the upper drum eccentricity adjustment tool.

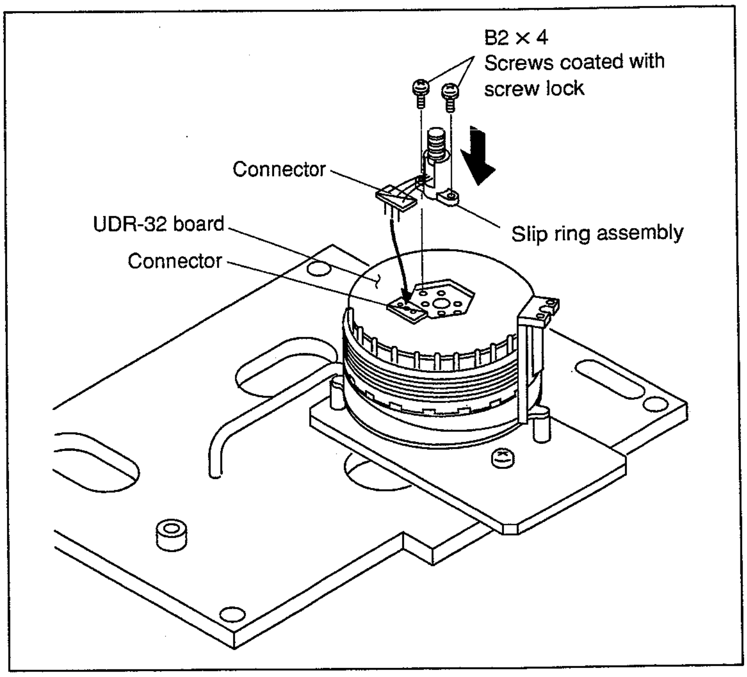
15. Installing the slip ring assembly

(1) Place the connector of the slip ring assembly in front of the connector on the UDR-32 board of the upper drum assembly. While installing the slip ring assembly to the drum shaft, connect the connectors.

(2) While pressing the slip ring assembly to the upper drum, install the slip ring assembly tentatively with the two screws that are coated with the locking compound with equal torque. Then tighten the screws with torque screwdriver.

The standard tightening torque value :

10×10^{-2} N•m (1 kg•cm)


B2 × 4
Screws coated with screw lock
Connector
UDR-32 board
Connector
Slip ring assembly

16. Installing the brush assembly

(1) Install the brush assembly tentatively to the brush support with the screw that is shown as ① by the illustration.

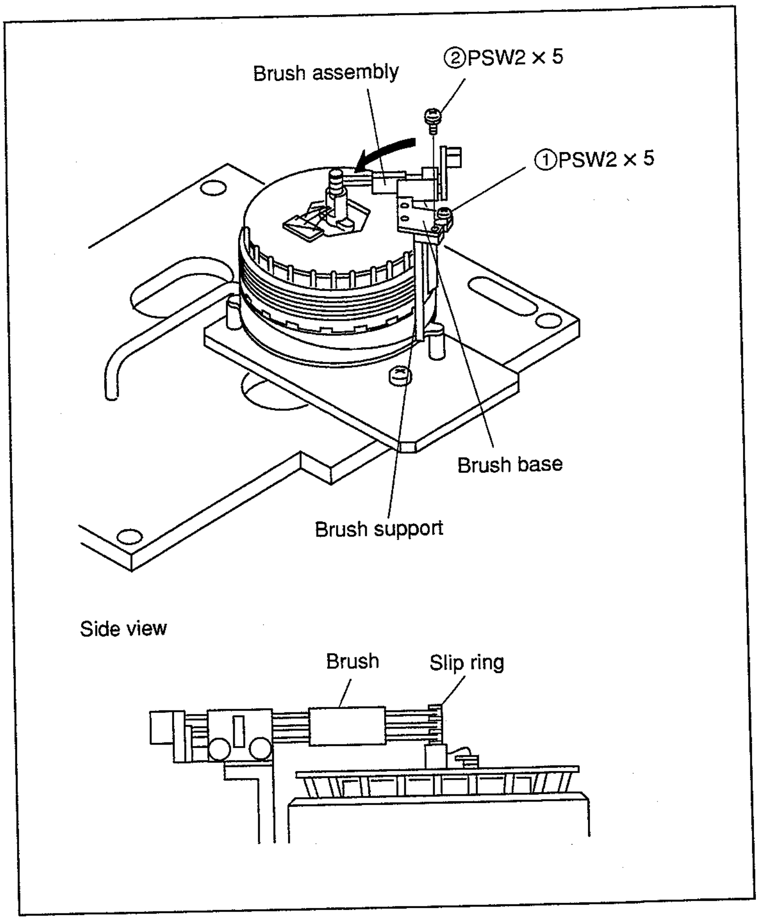
(2) Move the brush base in the direction of the arrow. Check that the brush touches against the slip ring correctly. Then tighten the screw ② tentatively.

(3) Finally tighten the screws that are tentatively tightened in steps (1) and (2).
The standard tightening torque value :
20×10^{-2} N•m (2 kgf•cm)

(4) Check that the two brushes touch to each of the three grooves of the slip ring respectively.

Note

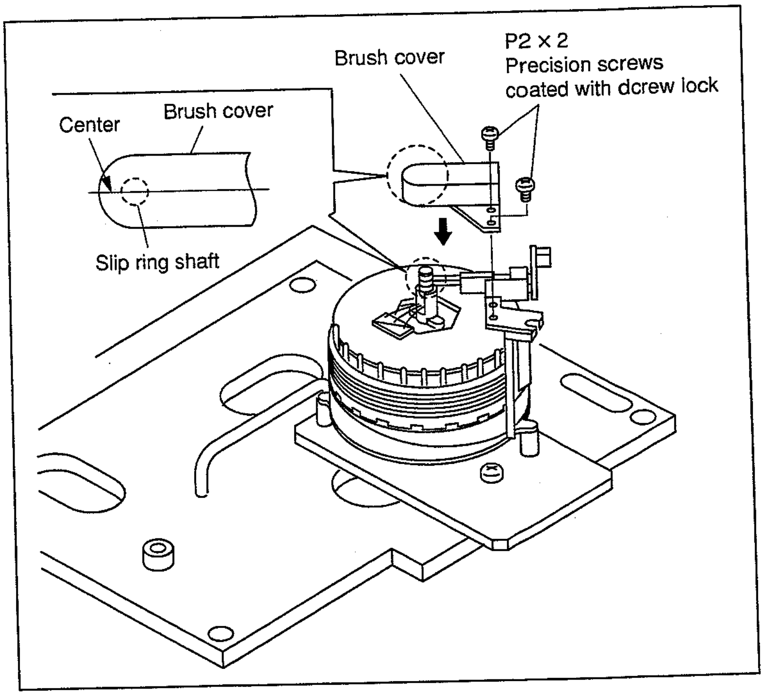
Once the above steps (1) to (3) are completed, the height of the brushes and the contact pressure of brushes against the slip ring will be automatically adjusted.


Brush assembly
②PSW2 × 5
①PSW2 × 5
Brush base
Brush support
Side view
Brush
Slip ring

17. Installing the brush cover

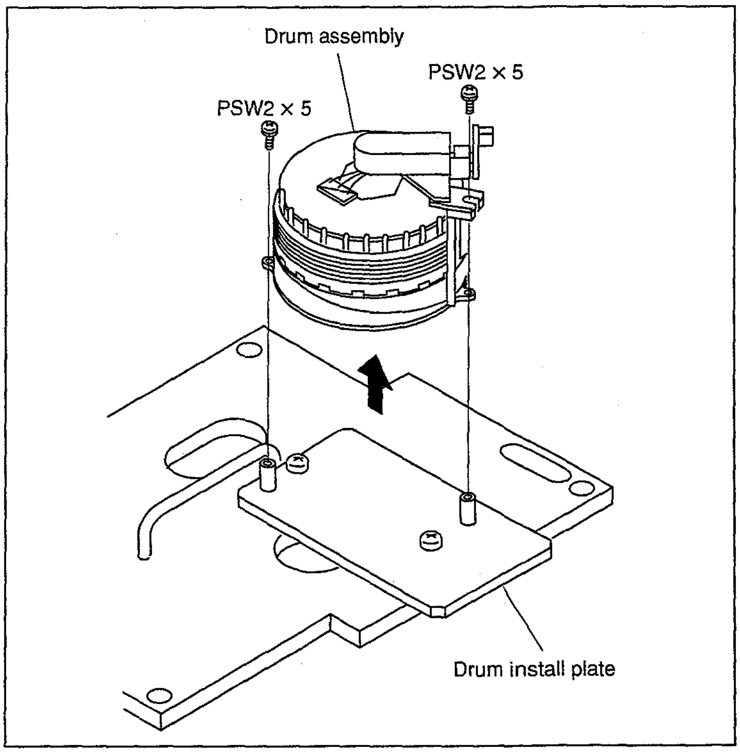
(1) Adjust the brush cover so that the slip ring shaft comes to the center of the top of the brush cover and tighten the two precision screws.
The standard tightening torque value :
10×10^{-2} N•m (1 kgf•cm)

(2) Coat the two precision screws with locking compound.


Brush cover
P2 × 2
Precision screws
coated with dcrew lock
Center
Brush cover
Slip ring shaft

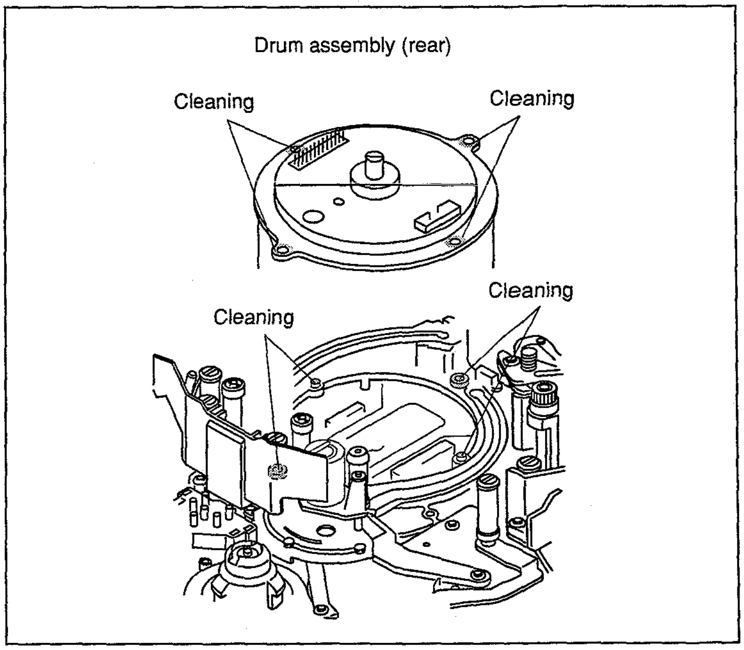
18. Removing the drum assembly from drum install plate

Remove the two screws and remove the drum assembly from the drum install plate.


Drum assembly
PSW2 x 5
PSW2 x 5
Drum install plate

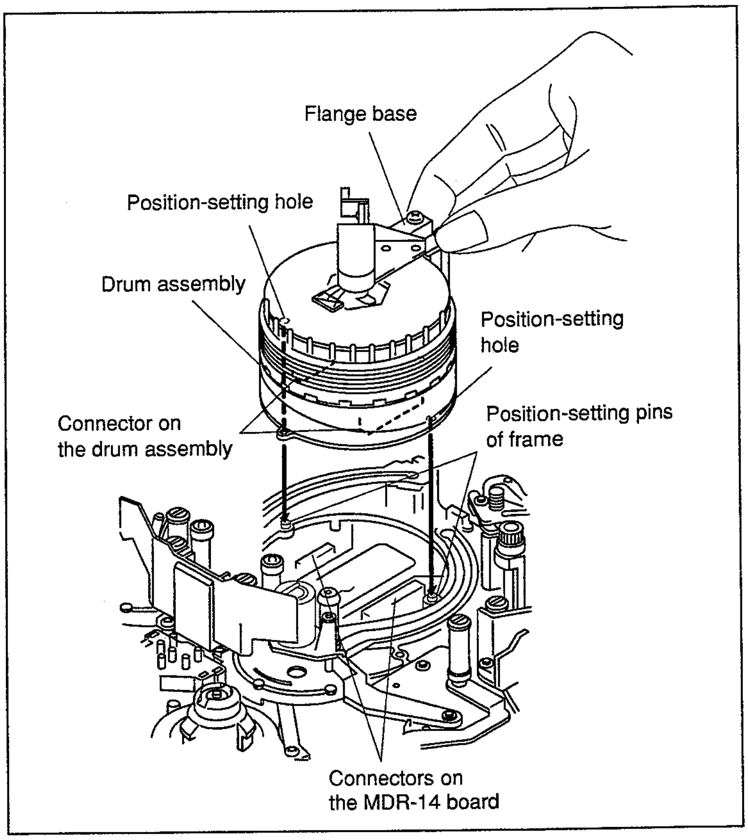
19. Cleaning the drum contact surface

Clean the contact surface of the rear of the drum assembly and the contact surface of the frame with a cleaning cloth moistened with cleaning fluid.


Drum assembly (rear)
Cleaning
Cleaning
Cleaning
Cleaning

20. Installing the drum assembly

(1) Hold the brush base with hands as shown in illustration. Align the connector on the bottom of the drum assembly with the connector on the MDR-14 board, and align the position-setting hole of the drum assembly with the position-setting pin of the frame.


Flange base
Position-setting hole
Drum assembly
Position-setting hole
Connector on the drum assembly
Position-setting pins of frame
Connectors on the MDR-14 board

(2) Push down the flange with two skewer perpendicularly, connect the connector (Fig. 1) and tighten the two screws. (Fig. 2)
The standard tightening torque value :
20×10^{-2} N•m (2 kgf•cm)

Note

Check that the brush cover and brush assembly are set in the right position.

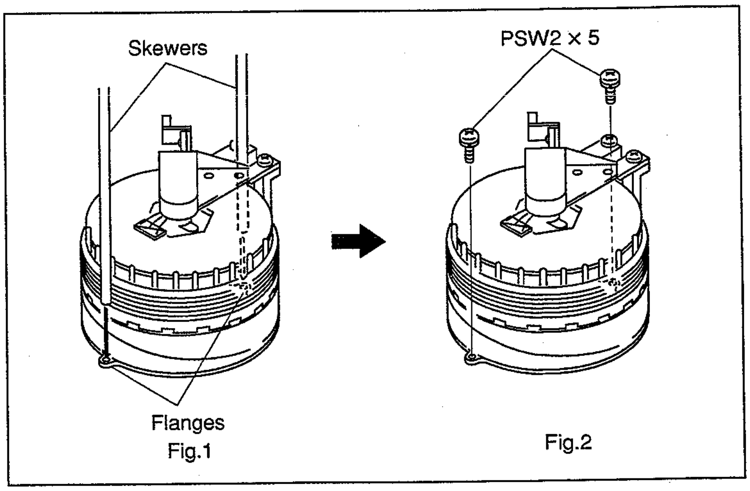

Skewers
PSW2 × 5
Flanges

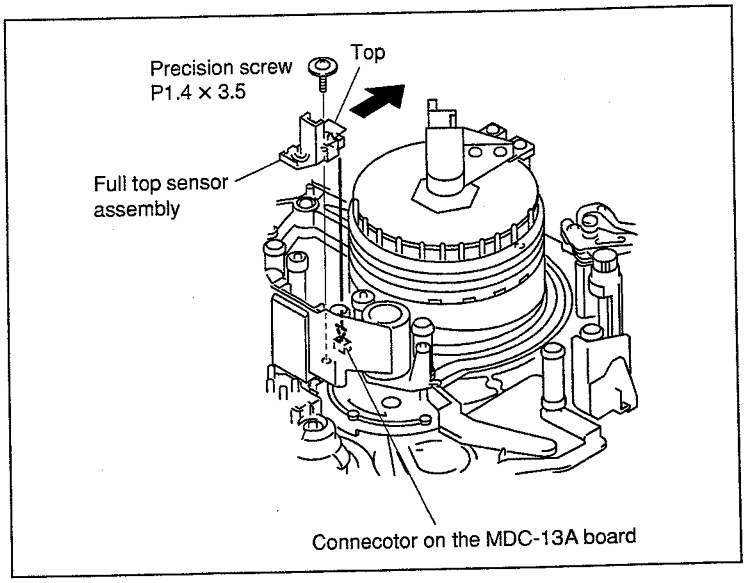
Fig.1

Fig.2

21. Installing the full top sensor Assembly

(1) Connect the connector of the full top sensor assembly to the connector on the MDC-13A board.

(2) Press down the full top sensor in the direction of the arrow until top of the full top sensor assembly touches the lower drum surface and tighten the precision screw.
The standard tightening torque value :
10×10^{-2} N•m (1 kgf•cm)

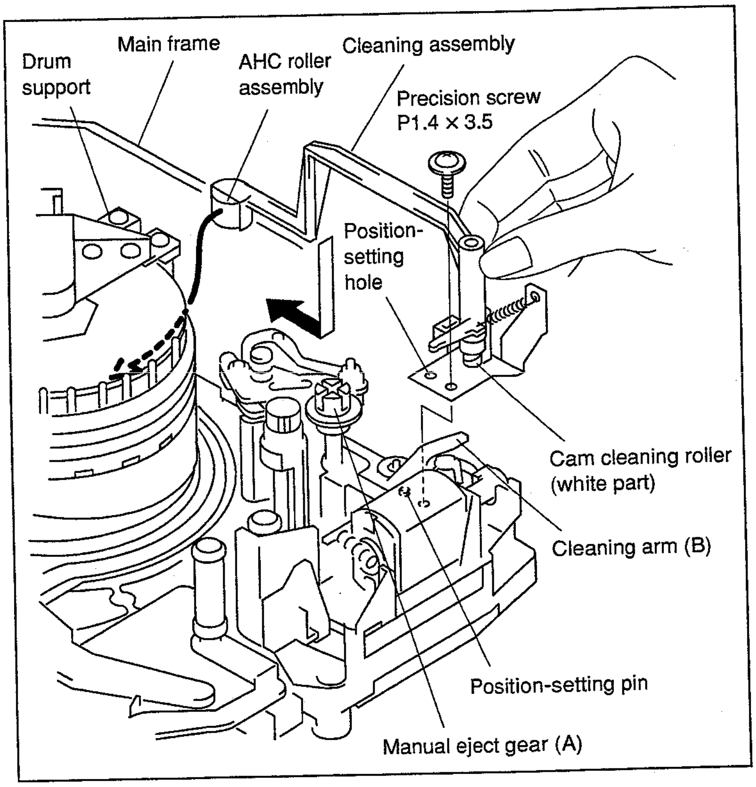

Precision screw
P1.4 x 3.5
Top
Full top sensor assembly
Connecotor on the MDC-13A board

22. Installing the cleaning assembly

(1) Insert the AHC roller assembly at the top of the cleaning assembly in between the main frame and drum support.

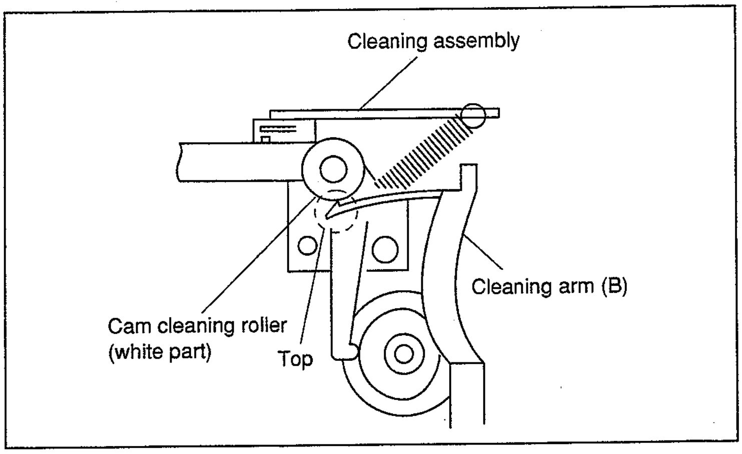
(2) Place the cleaning assembly under the manual eject gear (A) and move it in the direction of the arrow.

(3) Align the position-setting hole with the position-setting pin and tighten the precision screw.
The standard tightening torque value :
10×10^{-2} N•m (1 kgf•cm)


Drum support
Main frame
AHC roller assembly
Cleaning assembly
Precision screw
P1.4 x 3.5
Position-setting hole
Cam cleaning roller (white part)
Cleaning arm (B)
Position-setting pin
Manual eject gear (A)

Note

Check that top of the cleaning arm (B) is positioned on top of the cam cleaning roller (white part).



Operation Check

Rotate the manual eject gear (A) (red gear) clockwise and counter-clockwise several turns and check that the AHC roller assembly comes into contact with drum and is then detached. Check that its height also changes at the same time.

23. Connecting the connector to brush assembly

Connect the connector that is removed in step 2 to the connector on the brush assembly board.

24. Cleaning the cleaning assembly and tape running surface

Clean the following places using a cleaning cloth moistened with cleaning fluid.

- Video head (Refer to Section 2-1-2.)
- Tape running surface of upper drum
  (Refer to Section 2-1-2.)
- Rabbet guide and tape running surface of lower drum
  (Refer to Section 2-1-3.)

Note

After cleaning, be sure to wipe the cleaning fluid off the cleaned portions using a dry cleaning cloth.

Adjustments after Replacement

25. Tape run adjustment

(Refer to Section 8-2-1.)

26. Video tracking adjustment

(Refer to Section 8-2-2.)

27. CTL head height adjustment

(Refer to Section 8-2-3.)

28. CTL head position adjustment

(Refer to Section 8-2-4.)

29. TC head height adjustment

(Refer to Section 8-2-5.)

30. TC head position adjustment

(Refer to Section 8-2-6.)

31. Drum phase adjustment

(Refer to Section 10-4-4.)

7-3. Drum Assembly Replacement

Overview

Replacement

Removing the cleaning assembly
Removing connector from brush assembly
Removing the full top sensor assembly
Removing the drum assembly
Cleaning the drum contact surface
Installing the new drum assembly
Installing the full top sensor assembly
Installing the cleaning assembly
Connecting the connector to brush assembly
Cleaning the cleaning assembly and tape running surface

Adjustments after replacement

Tape run adjustment
Video tracking adjustment
CTL head height adjustment
CTL head position adjustment
TC head height adjustment
TC head position adjustment
Drum phase adjustment

Note

If rotary heads are worn out or broke, replace the entire upper drum assembly. The head chip cannot be replaced independently.

Basic Information

Apart from the periodic replacement time, the upper drum assembly needs to be replaced in the following cases.

- If a correct RF waveform cannot be obtained after the tracking adjustment.

Preparations

Preparation on unit's side

1. Check that the unit is in the unthreading-end state.
2. Turn the POWER switch to OFF.
3. Remove the front lid and outside panel assembly. (Refer to Section 1-4.)

Note

The upper drum assembly can be replaced when the cassette compartment attaches to the unit.

Tools

- Torque screwdriver bit : J-6325-380-A (for M2)
- Torque screwdriver bit : J-6325-110-A (for M1.4)
- Torque screwdriver (for 3 kg) : J-6325-400-A
- Cleaning cloth: 3-184-527-01
- Cleaning fluid: 9-919-573-01
- Skewer

Removal

1. Removing the cleaning assembly

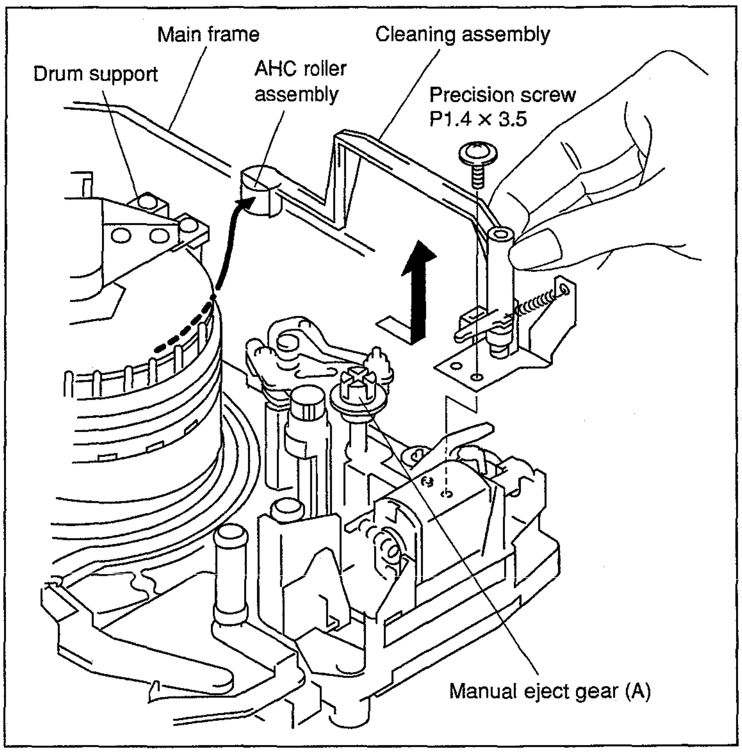
Setting mode:
Enter the unthreading-end state of the unit.

(1) Remove the precision screw and hold the specified position of the cleaning assembly as shown in the illustration, and raise it up exceeding the top of the manual eject gear (A).

(2) Remove the AHC roller assembly of the cleaning assembly between the drum support and main frame.

Note

When removing the cleaning assembly, be careful not to touch the upper drum assembly and drum assembly.


Main frame
Cleaning assembly
Drum support
AHC roller assembly
Precision screw P1.4 × 3.5
Manual eject gear (A)

2. Removing connector from brush assembly

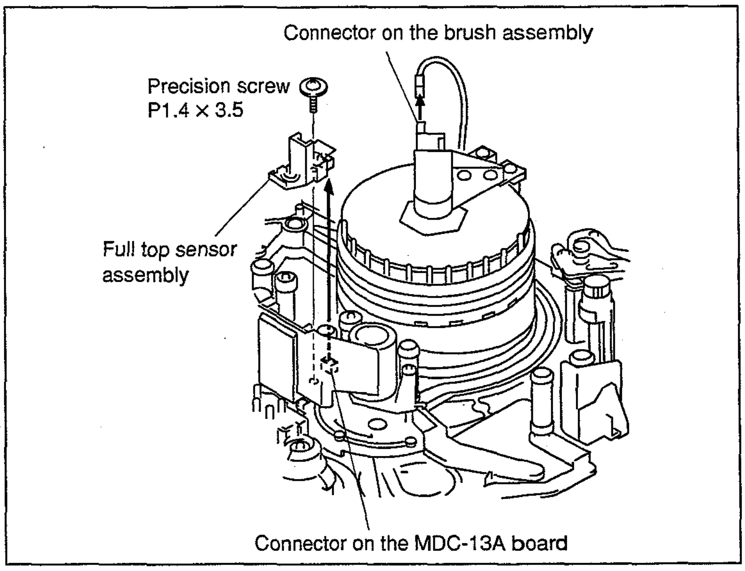
Remove the connector from the brush assembly.

3. Removing the full top sensor assembly

Remove the precision screw. While removing the connector on the MDC-13A board, remove the full top sensor assembly.

Note

When removing the full top sensor assembly, be very careful not to touch the drum.


Connector on the brush assembly
Precision screw P1.4 × 3.5
Full top sensor assembly
Connector on the MDC-13A board

4. Removing the drum assembly

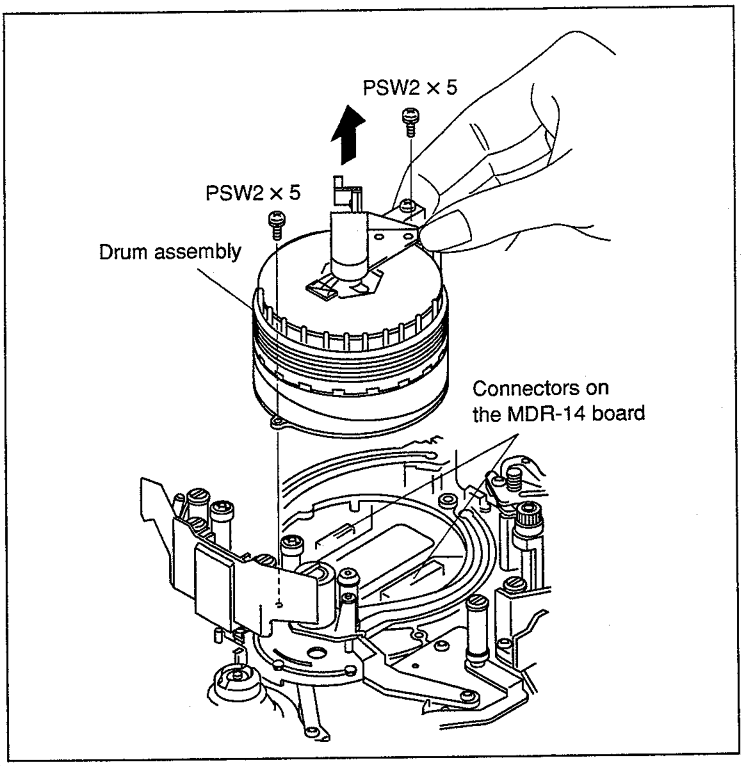
Note

The drum assembly is fixed by the two screws. The drum assembly is connected with the MDR-14 board on the rear of the mechanical deck with connector. Due to these connections, do not put excessive for ce to the dum assembly even after it is removed.

Note

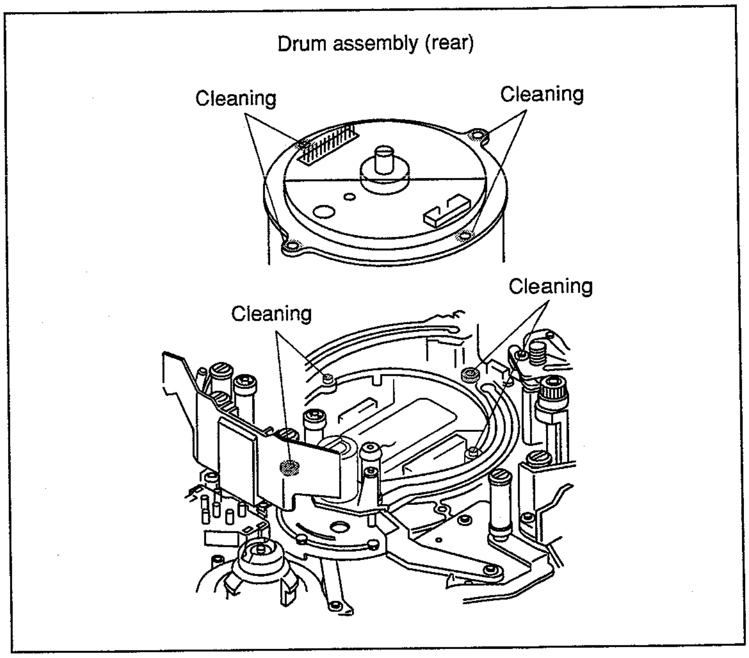
When removing the drum assembly, be careful not to touch the CTL head, TC head and nearby tape guides.

Remove the two screws. Hold the upper part of the brush support. While loosening the connector on the MDC-13A board, remove the drum assembly.


PSW2 x 5
PSW2 x 5
Drum assembly
Connectors on the MDR-14 board

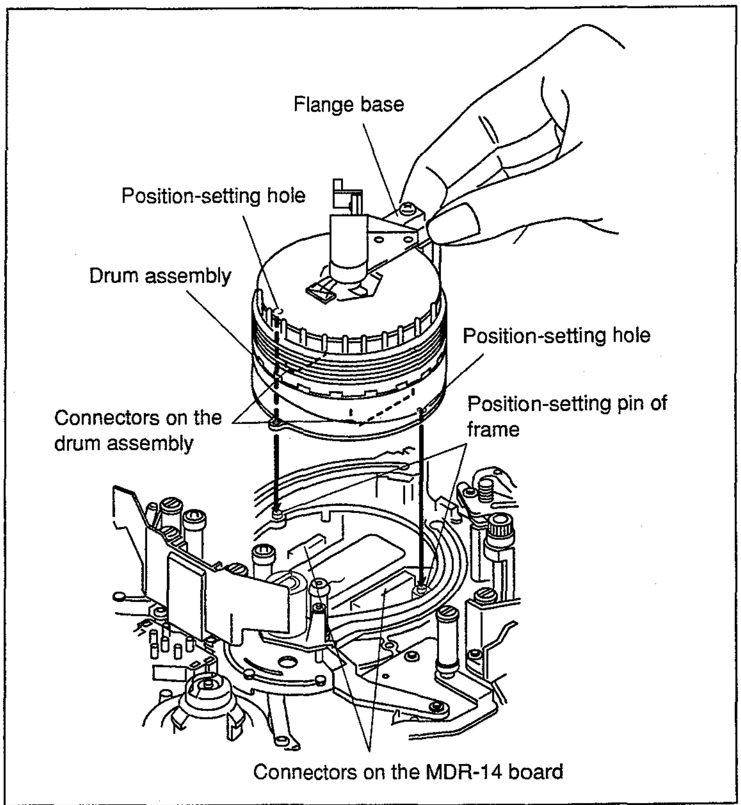
5. Cleaning the drum contact surface

Clean the drum contact surface on the rear of the new drum assembly using a cleaning cloth moistened with cleaning fluid.


Drum assembly (rear)
Cleaning
Cleaning
Cleaning
Cleaning

6. Installing the new drum assembly

(1) Hold the brush base with hands as shown in the illustration. Align the connector on the bottom of the drum assembly with the connector on the MDR-14 board, and align the position-setting hole of the drum assembly with the position-setting pin of the frame.


Flange base
Position-setting hole
Drum assembly
Position-setting hole
Connectors on the drum assembly
Position-setting pin of frame
Connectors on the MDR-14 board

(2) Push down the flange with two skewers perpendicularly, connect the connector (Fig. 1) and tighten the two screws. (Fig. 2)
The standard tightening torque value :
20 × 10^{-2} N•m (2 kgf•cm)

Note

Check that the brush cover and brush assembly are set in the right position.

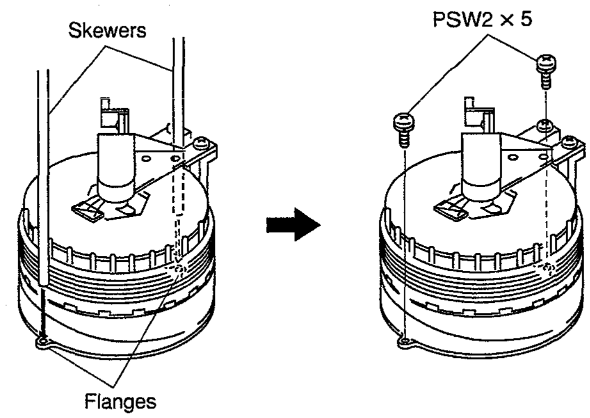

Skewers
PSW2 × 5
Flanges

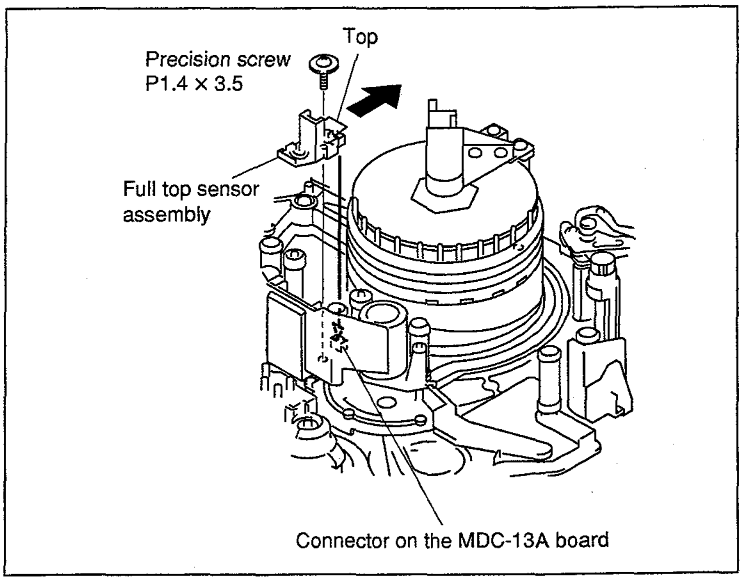
Fig.1

Fig.2

7. Installing the full top sensor assembly

(1) Connect the connector on the full top sensor assembly to the connector on the MDC-13A board.

(2) Press down the full top sensor in the direction of the arrow until top of the full top sensor assembly touches the lower drum surface and tighten the precision screw.
The standard tightening torque value :
10×10^{-2} N•m (1 kgf•cm)

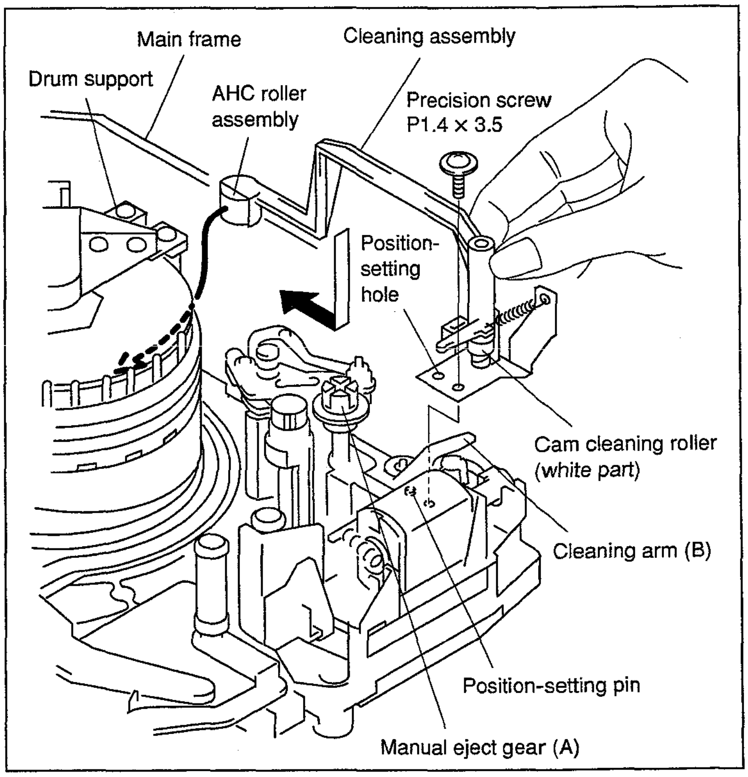

Top
Precision screw
P1.4 × 3.5
Full top sensor assembly
Connector on the MDC-13A board

8. Installing the cleaning assembly

(1) Insert the AHC roller assembly at the top of the cleaning assembly in between the main frame and drum support.

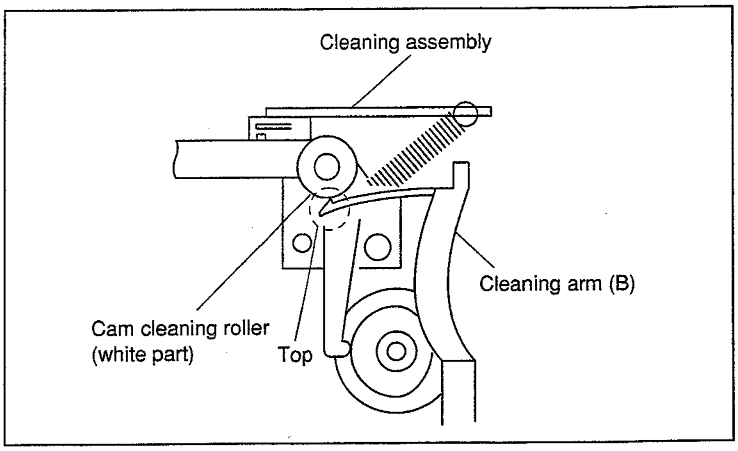
(2) Place the cleaning assembly under the manual eject gear (A) and move it in the direction of the arrow.

(3) Align the position-setting hole with the position-setting pin and tighten the precision screw.
The standard tightening torque value :
10×10^{-2} N•m (1 kgf•cm)


Main frame
Cleaning assembly
Drum support
AHC roller assembly
Precision screw
P1.4 × 3.5
Position-setting hole
Cam cleaning roller (white part)
Cleaning arm (B)
Position-setting pin
Manual eject gear (A)

Note

Check that top of the cleaning arm (B) is positioned on top of the cam cleaning roller (white part).



Operation Check

Rotate the manual eject gear (A) (red gear) clockwise and counter-clockwise several turns and check that the AHC roller assembly comes into contact with drum and is then detached. Check that its height also changes at the same time.

9. Connecting the connector to brush assembly

Connect the connector that is removed in step 2 to the connector on the brush assembly board.

10. Cleaning the cleaning assembly and tape running surface

Clean the following places using a cleaning cloth moistened with cleaning fluid.

- Video head (Refer to Section 2-1-2.)
- Tape running surface of upper drum (Refer to Section 2-1-2.)
- Rabbet guide and tape running surface of lower drum (Refer to Section 2-1-3.)

Note

After cleaning, be sure to wipe the cleaning fluid off the cleaned portions using a dry cleaning cloth.

Adjustments after Replacement

11. Tape run adjustment

(Refer to Section 8-2-1.)

12. Video tracking adjustment

(Refer to Section 8-2-2.)

13. CTL head height adjustment

(Refer to Section 8-2-3.)

14. CTL head position adjustment

(Refer to Section 8-2-4.)

15. TC head height adjustment

(Refer to Section 8-2-5.)

16. TC head position adjustment

(Refer to Section 8-2-6.)

17. Drum phase adjustment

(Refer to Section 10-4-4.)

7-4. Replacement of Brush Assembly for Slip Ring

Overview

Replacement

Removing connector from brush assembly
Removing the brush cover
Removing the brush assembly
Installing the brush assembly
Installing the brush cover
Connecting the connector to brush assembly

Notes

- If brushes are worn out, replace the entire brush assembly.
- When the brush assembly installation is completed with the following steps, the height of the brushes and the contact pressure of brushes against the slip ring will be automatically adjusted. No adjustment is required after replacement.
- Never attach cleaning fluid on the brush surface.

Preparations

Preparation on unit's side

1. Turn the POWER switch to OFF.
2. Remove the front lid and outside panel assembly. (Refer to Section 1-4.)

Note

The brush assembly can be replaced when the cassette compartment attaches to the unit

Tools

- Torque screwdriver bit (for M2) : J-6325-380-A
- Torque screwdriver bit (for M1.4) : J-6325-110-A
- Torque screwdriver (for 3 kg) : J-6325-400-A
- Locking compound : 7-432-114-11

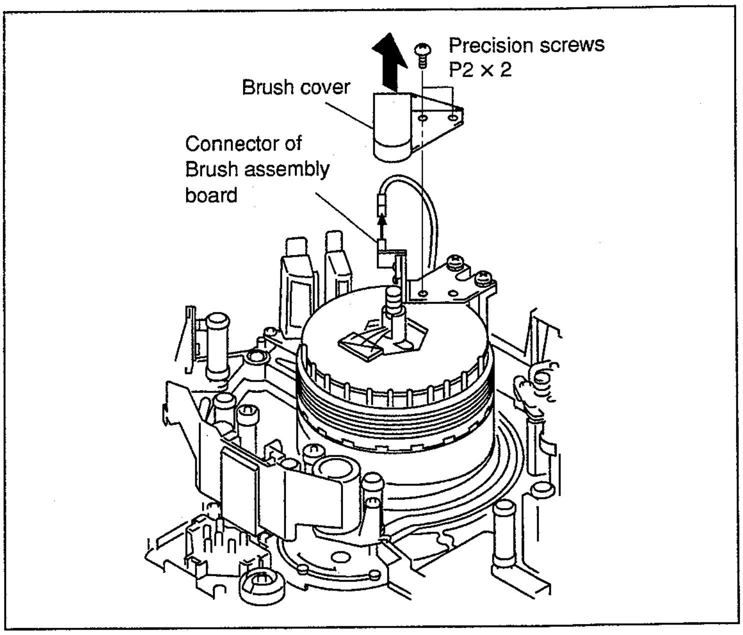
Removal

1. Removing connector from brush assembly

Remove the connector from the brush assembly board.

2. Removing the brush cover

Remove the two precision screws and remove the brush cover in the direction of the arrow.

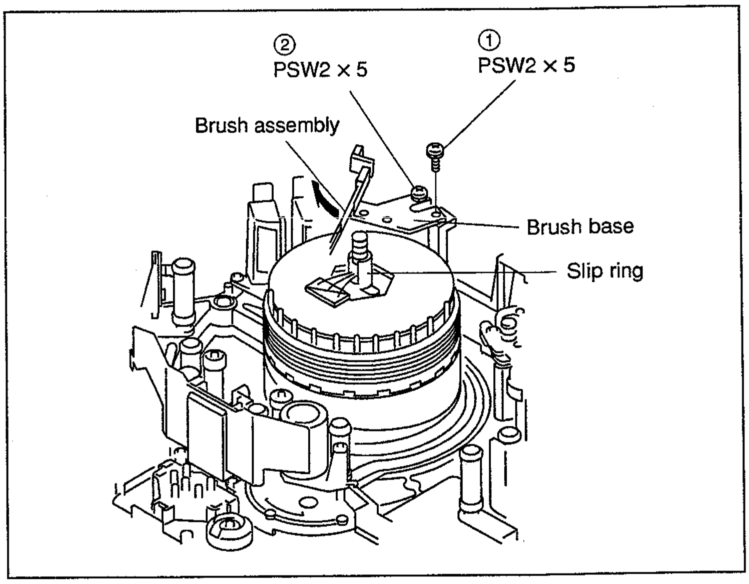

Precision screws
P2 × 2
Brush cover
Connector of
Brush assembly
board

3. Removing the brush assembly

(1) Among the two screws that are fixing the brush base, remove the screw that is shown as ① by the illustration.

(2) Loosen the screw ② and move the brush base in the direction of the arrow.

(3) Remove the screw ② and remove the brush assembly.


②
PSW2 × 5
①
PSW2 × 5
Brush assembly
Brush base
Slip ring

Installation

4. Installing the brush assembly

(1) Install the new brush assembly tentatively to the brush support with the screw as shown.

(2) Move the brush base in the direction of the arrow. Check that the brush touches against the slip ring correctly. Then tighten the other screw tentatively.

(3) Finally tighten the screws that are tentatively tightened in steps (1) and (2).
The standard tightening torque value :
20×10^{-2} N•m (2 kgf•cm)

(4) Check that the two brushes touch to each of the three grooves of the slip ring respectively.

Note

Once the above steps (1) to (3) are completed, the height of the brushes and the contact pressure of brushes against the slip ring will be automatically adjusted.

Top view

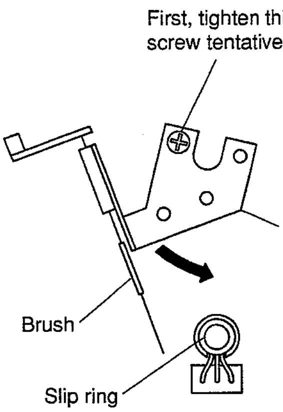

First, tighten this screw tentatively.
Brush
Slip ring

Fig.1

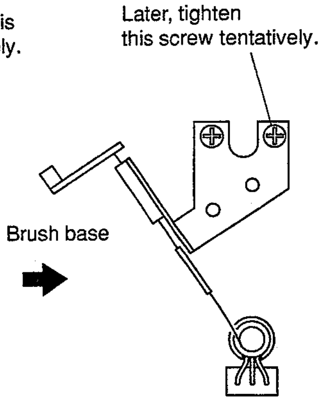
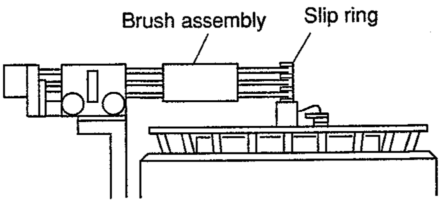

Later, tighten this screw tentatively.
Brush base

Fig.2

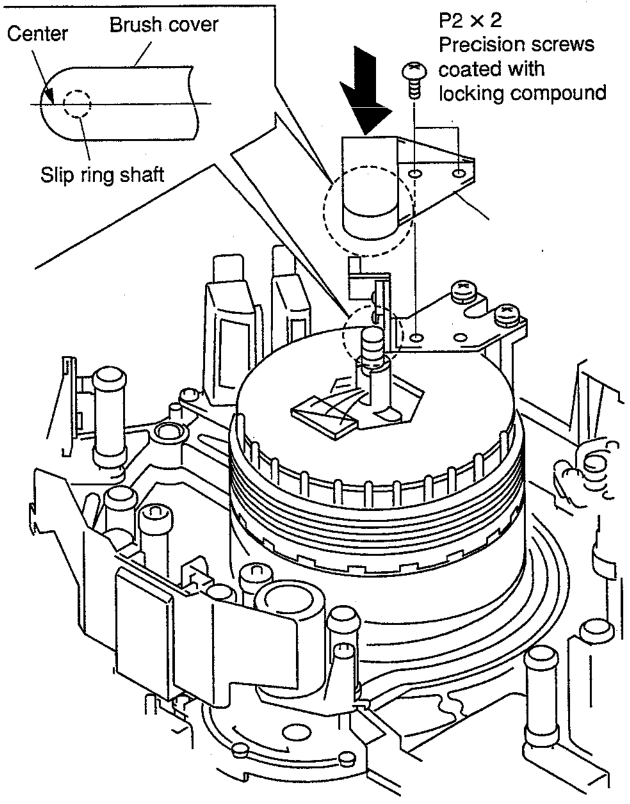
Side view


Brush assembly
Slip ring

5. Installing the brush cover

(1) Adjust the brush cover so that the slip ring shaft comes to the center of the top of the brush cover and tighten the two precision screws.
The standard tightening torque value :
10×10^{-2} N•m (1 kgf•cm)

(2) Coat the two precision screws with locking compound.


Center
Brush cover
Slip ring shaft
P2 × 2
Precision screws coated with locking compound

6. Connecting the connector to brush assembly

Connect the connector that is removed in step 1 to the connector on the brush assembly board.

Note

Check that the brush assembly has moved out of the correct position.

7-5. Slip Ring Assembly Replacement

Overview

Replacement

Removing connector from brush assembly
Removing the brush cover
Removing the brush assembly
Removing the slip ring assembly
Installing the slip ring assembly
Installing the brush assembly
Installing the brush cover
Connecting the connector to brush assembly

Notes

- When the brush assembly installation is completed with the following steps, the height of the brushes and the contact pressure of brushes against the slip ring will be automatically adjusted. No adjustment is required after replacement.
- Never attach cleaning fluid on the brush surface.

Preparations

Preparation on unit's side

1. Turn the POWER switch to OFF.
2. Remove the front lid and outside panel assembly. (Refer to Section 1-4.)

Note

The brush assembly can be replaced when the cassette compartment attaches to the unit.

Tools

- Torque screwdriver bit (for M2) : J-6325-380-A
- Torque screwdriver bit (for M1.4) : J-6325-110-A
- Torque screwdriver (for 3 kg) : J-6325-400-A
- Cleaning cloth : 3-184-527-01
- Cleaning fluid: 9-919-573-01
- Locking compound : 7-432-114-11

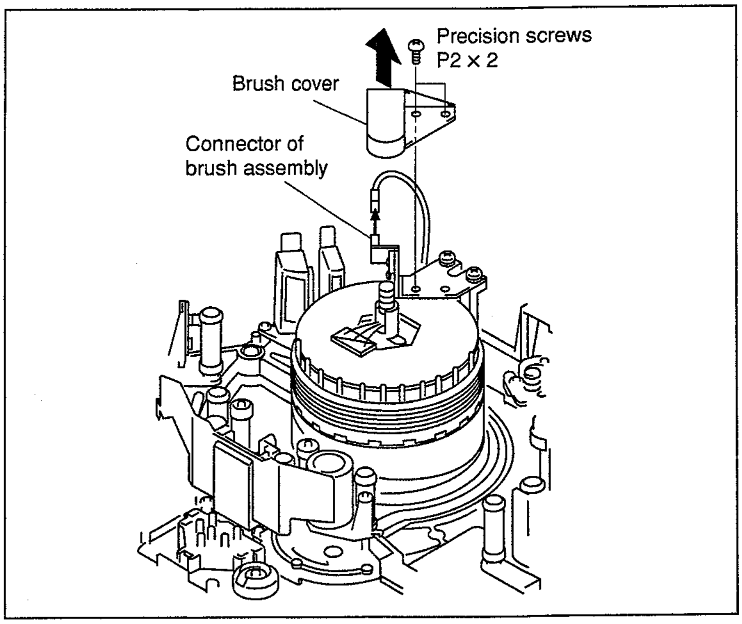
Removal

1. Removing connector from brush assembly

Remove the connector from the brush assembly board.

2. Removing the brush cover

Remove the two precision screws and remove the brush cover in the direction of the arrow.

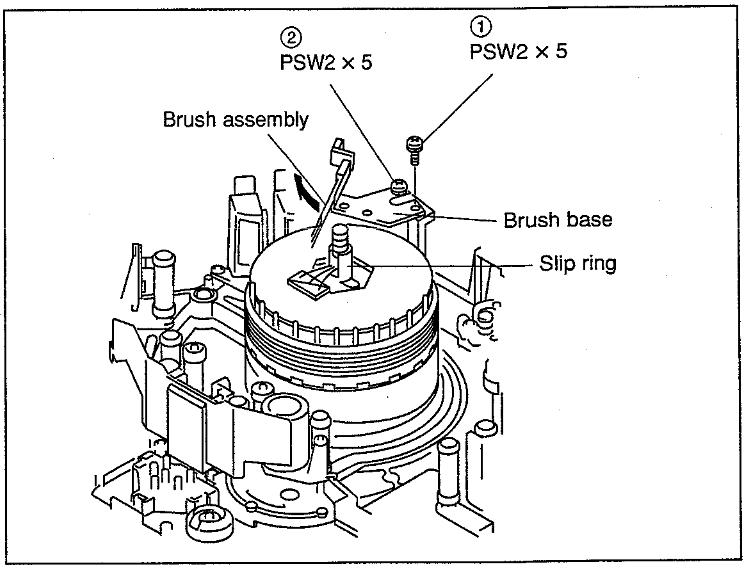

Precision screws
P2 x 2
Brush cover
Connector of
brush assembly

3. Removing the brush assembly

(1) Among the two screws that are fixing the brush base, remove the screw that is shown as ① by the illustration.

(2) Loosen the screw ② and move the brush base in the direction of the arrow.

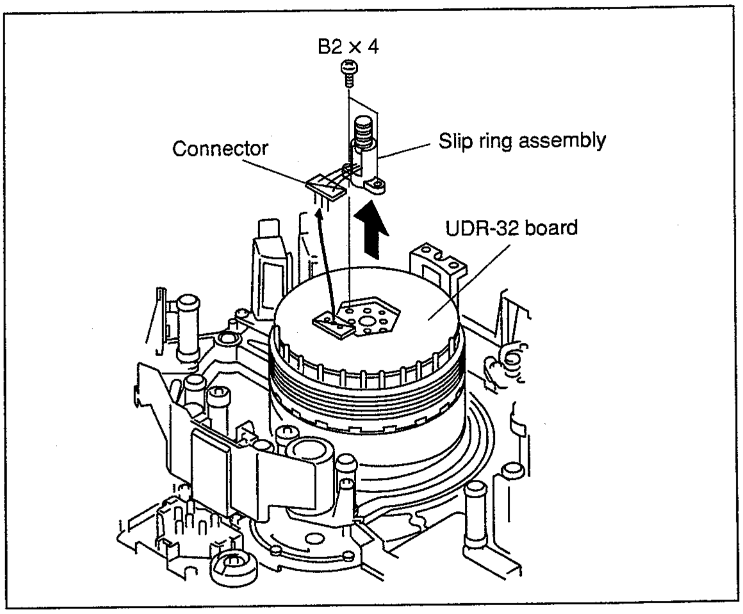
(3) Remove the screw ② and remove the brush assembly.


②
PSW2 x 5
①
PSW2 x 5
Brush assembly
Brush base
Slip ring

4. Removing the slip ring assembly

(1) Remove the two screws fixing the slip ring assembly.

(2) While removing the connector on the UDR-32 board, remove the slip ring assembly together.


B2 x 4
Connector
Slip ring assembly
UDR-32 board

Installation

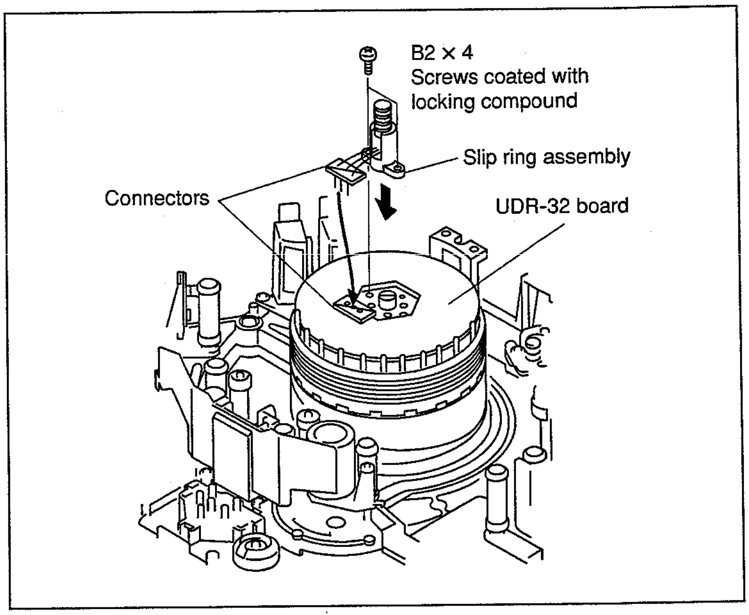
5. Installing the slip ring assembly

Note

When the upper drum assembly is not going to be replaced, remove the locking compound that has adhered to the two screws that fix the upper drum slip ring assembly.

(1) Place the connector of the new slip ring assembly in front of the connector on the UDR-32 board of the upper drum assembly. While installing the slip ring assembly to the drum shaft, connect the connectors.

(2) While pressing the slip ring assembly to the upper drum, install the slip ring assembly with the two screws that are coated with the locking compound with equal torque. Then tighten the screws with torque screwdriver.
The standard tightening torque value :
10×10^{-2} N•m (1 kgf•cm)


B2 x 4
Screws coated with locking compound
Slip ring assembly
Connectors
UDR-32 board

6. Installing the brush assembly

(1) Install the new brush assembly tentatively to the brush support with the screw as shown.

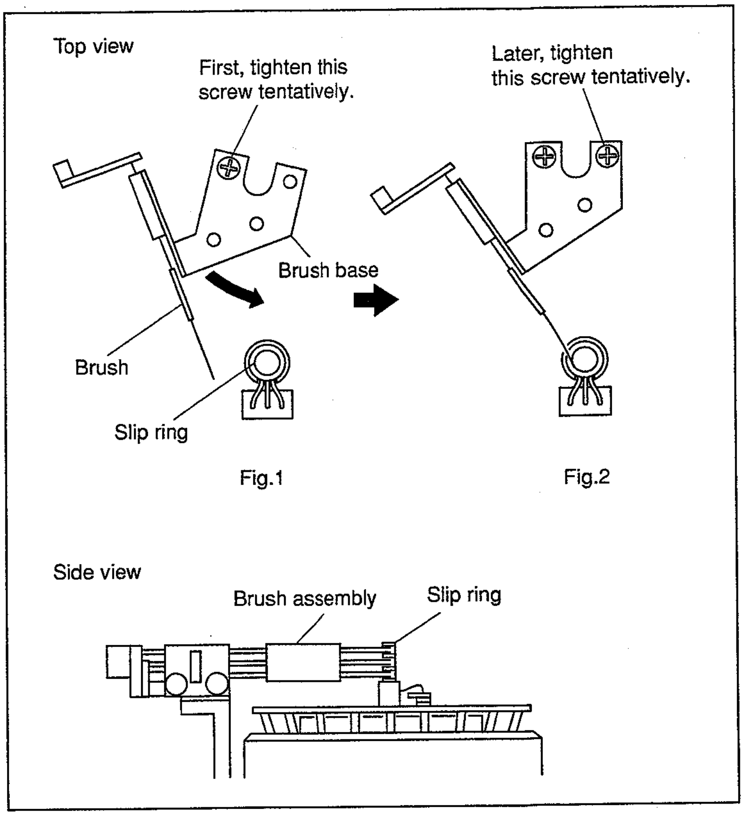
(2) Move the brush base in the direction of the arrow. Check that the brush touches against the slip ring correctly. Then tighten the other screw tentatively.

(3) Finally tighten the screws that are tentatively tightened in steps (1) and (2).
The standard tightening torque value :
20×10^{-2} N•m (2 kgf•cm)

(4) Check that the two brushes touch to each of the three grooves of the slip ring respectively.

Note

Once the above steps (1) to (3) are completed, the height of the brushes and the contact pressure of brushes against the slip ring will be automatically adjusted.


Top view
First, tighten this screw tentatively.
Later, tighten this screw tentatively.
Brush base
Brush
Slip ring
Fig.1
Fig.2
Side view
Brush assembly
Slip ring

7. Installing the brush cover

(1) Adjust the brush cover so that the slip ring shaft comes to the center of the top of the brush cover and tighten the two precision screws.
The standard tightening torque value :
10×10^{-2} N•m (1 kgf•cm)

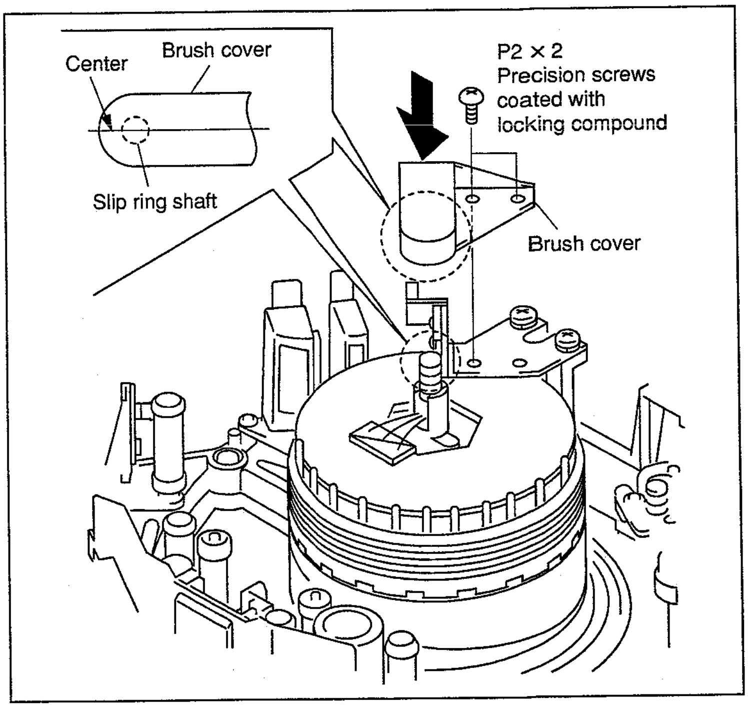
(2) Coat the two precision screws with locking compound.

8. connecting the connector to brush assembly

Connect the connector that is removed in step 1 to the connector on the brush assembly board.

Note

Check that the brush assembly has moved out of the correct position.


Center
Brush cover
Slip ring shaft
P2 × 2
Precision screws coated with locking compound
Brush cover

7-6. Replacement of AHC Roller Assembly for Video Head

Overview

Replacement

Removing the cleaning assembly
Replacement of AHC roller assembly for video head
Installing the cleaning assembly
Operation check

Note

When replacing the cleaning assembly, be careful not to touch the video head.

Preparations

1. Check that the unit is in the unthreading-end state.
2. Turn the POWER switch to OFF.
3. Remove the front lid and the outside panel assembly. (Refer to Section 1-4.)

Note

In order to replace the AHC roller assembly, the new CR spacer is required. Prepare the new CR spacer (3-182-765-02) when replacing the AHC roller assembly.

Note

The cleaning assembly can be replaced when the cassette compartment attaches to the unit.

Removal

1. Removing the cleaning assembly

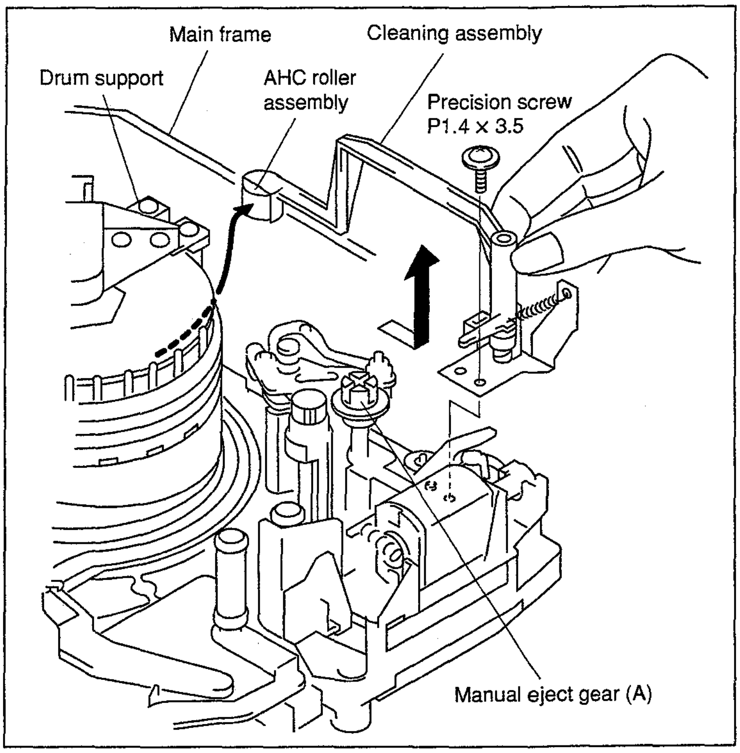
Setting mode:
Enter the unthreading-end state of the unit.

(1) Remove the precision screw and hold the specified position of the cleaning assembly as shown in the illustration, and raise it up exceeding the top of the manual eject gear (A).

(2) Remove the AHC roller assembly of the cleaning assembly between the drum support and main frame.

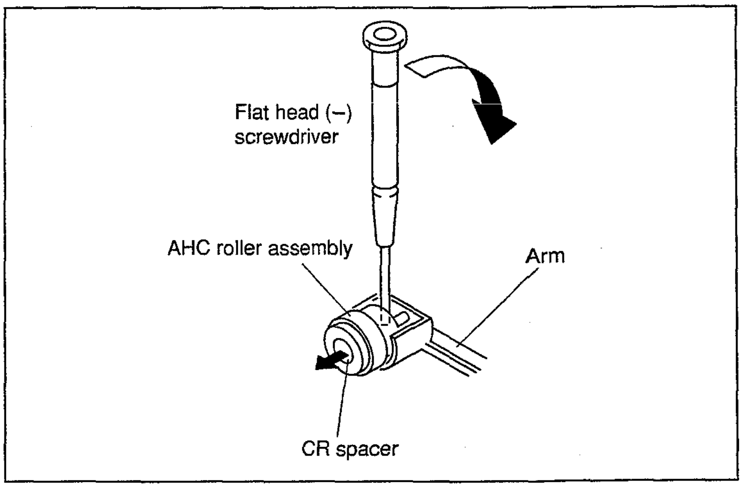
Note

When removing the cleaning assembly, be careful not to touch the upper drum assembly and drum assembly.


Main frame
Cleaning assembly
Drum support
AHC roller assembly
Precision screw P1.4 x 3.5
Manual eject gear (A)

2. Replacement of AHC roller assembly for video head

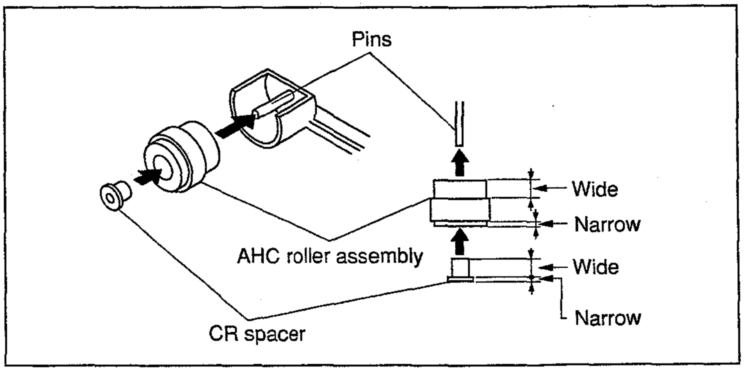
(1) Remove the AHC roller assembly and the CR spacer from the arm with flat head (−) screwdriver as shown.


Flat head (−) screwdriver
AHC roller assembly
Arm
CR spacer

(2) Assemble the new AHC roller assembly and the new CR spacer as shown in illustration.

Note

Never attach oil on the new AHC roller assembly.

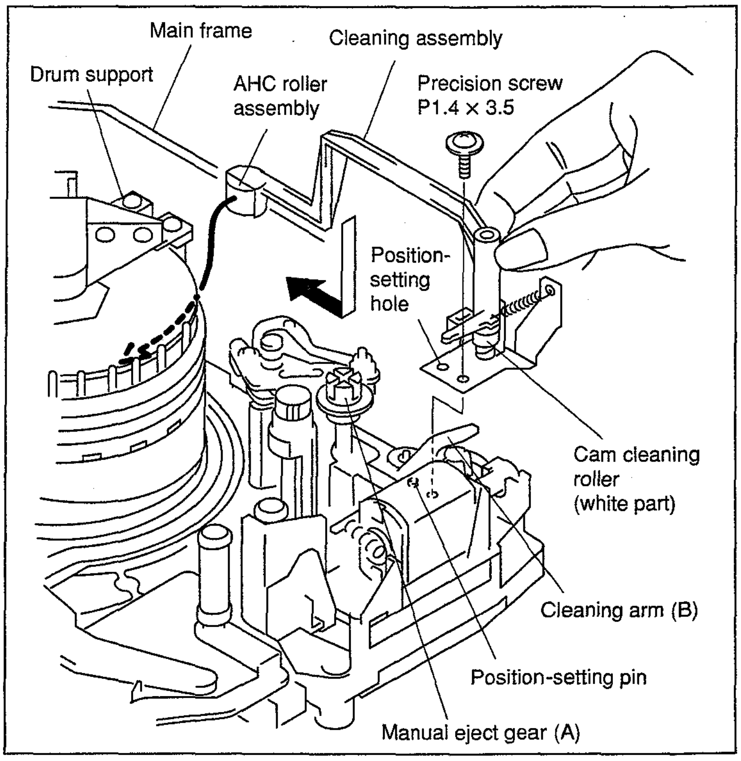

Pins
Wide
Narrow
AHC roller assembly
Wide
Narrow
CR spacer

3. Installing the cleaning assembly

(1) Insert the AHC roller assembly at the top of the cleaning assembly in between the main frame and drum support.

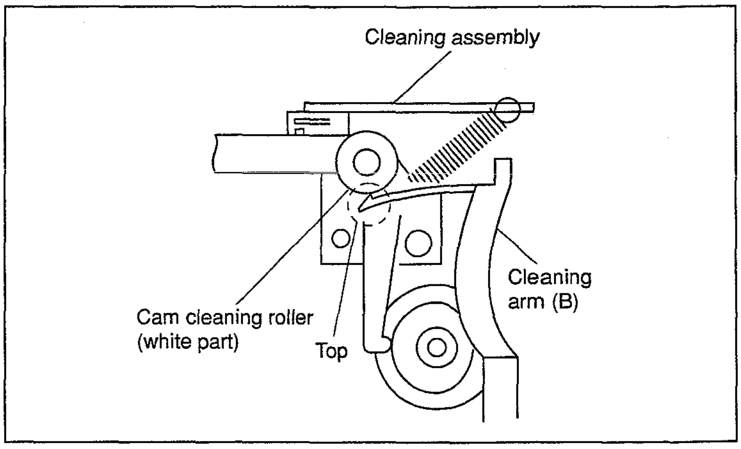
(2) Place the cleaning assembly under the manual eject gear (A) and move it in the direction of the arrow.

(3) Align the position-setting hole with the position-setting pin and tighten the precision screw.
The standard tightening torque value :
10×10^{-2} N•m (1 kgf•cm)


Main frame
Cleaning assembly
Drum support
AHC roller assembly
Precision screw P1.4 × 3.5
Position-setting hole
Cam cleaning roller (white part)
Cleaning arm (B)
Position-setting pin
Manual eject gear (A)

Note

Check that top of the cleaning arm (B) is positioned on top of the cam cleaning roller (white part).


Cleaning assembly
Cleaning arm (B)
Cam cleaning roller (white part)
Top

4. Operation check

Rotate the manual eject gear (A) (red gear) clockwise and counter-clockwise several turns and check that the AHC roller assembly comes into contact with drum and is then detached. Check that its height also changes at the same time.

7-7. Pinch Roller Assembly Replacement

Overview

Replacement

Removing the pinch roller assembly
Cleaning the mount shaft
Installing the pinch roller assembly
Cleaning the pinch roller assembly

Adjustments after replacement

Tape run adjustment
TC head height check

Note

If pinch roller assembly is worn out, replace the pinch roller assembly assembly only not as an assembly.
Be sure to wear a pair of gloves to for the replacement work.

Preparations

1. Check that the unit is in the unthreading-end state.
2. Turn the POWER switch to OFF.
3. Remove the front lid and outside panel assembly. (Refer to Section 1-4.)

Note

Pinch roller assembly can be replaced when the cassette compartment attaches to the unit.

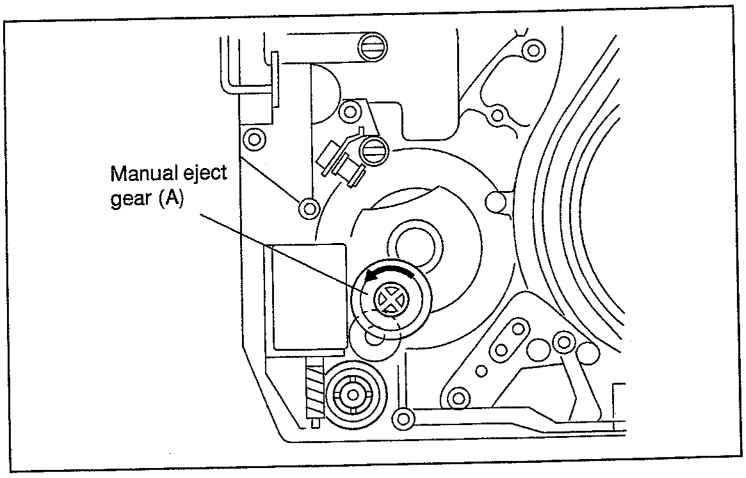
Tools

• Torque screwdriver bit (for M1.4) :	J-6325-110-A
• Torque screwdriver (for 3 kg) :	J-6325-400-A
• Cleaning cloth:	3-184-527-01
• Cleaning fluid:	9-919-573-01

Removal

1. Removing the pinch roller assembly

(1) Rotate the manual eject gear (A) counterclockwise and remove it until the pinch roller assembly comes out of the rib of the cassette stopper completely.

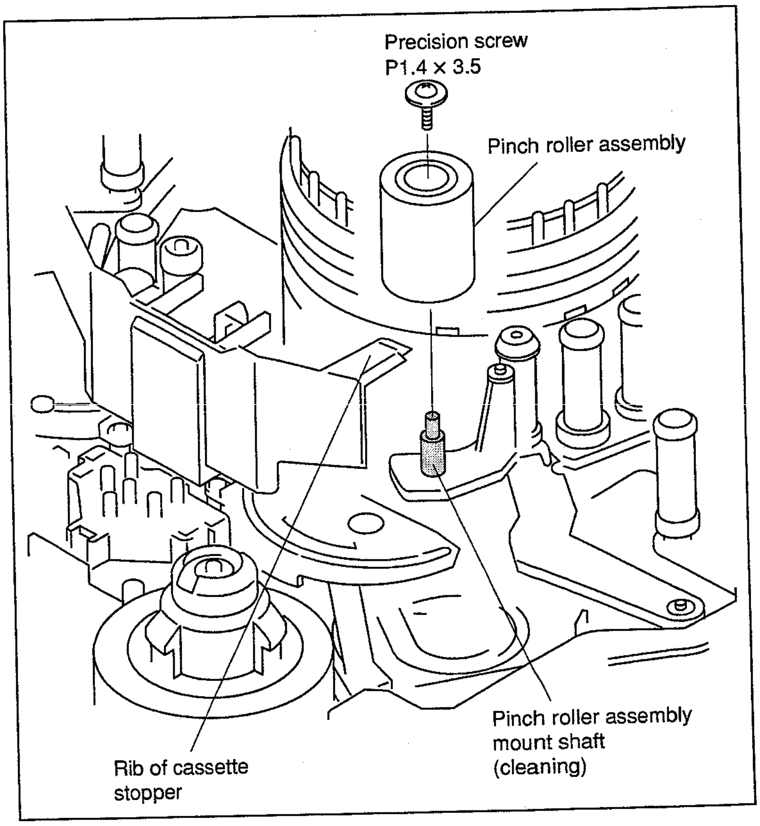

Manual eject gear (A)

(2) Loosen the precision screw in the center of pinch roller assembly. Remove the pinch roller assembly by pulling it straight up.

Note

When loosening the precision screw, do not press it excessively with screwdriver. At the same time, rotate the screwdriver while holding the pinch roller assembly with hand.

(3) Remove the precision screw from pinch roller assembly.


Precision screw
P1.4 x 3.5
Pinch roller assembly
Pinch roller assembly mount shaft (cleaning)
Rib of cassette stopper

Installation

2. Cleaning the mount shaft

Clean the pinch roller assembly mount shaft using a cleaning cloth moistened with cleaning fluid.

3. Installing the pinch roller assembly

Install the pinch roller assembly to the pinch roller assembly mount shaft. Tighten the precision screw that is removed in step 1.
The standard tightening torque value : 10×10^{-2} N•m (1 kgf•cm)

Note

Never touch the pinch roller assembly surface with bare hands.

Note

Top and bottom of the pinch roller assembly are identical and cannot be identified each other.

4. Cleaning the pinch roller assembly

Clean the surface of the pinch roller assembly using a cleaning cloth moistened with cleaning fluid.
Rotate the manual eject gear (A) clockwise until the unit returns to the unthreading-end state.

Adjustments after Replacement

5. Tape run adjustment

(Refer to Section 8-2-1.)

6. TC head height check

(Refer to Section 8-2-5.)

7-8. S-Tension Regulator Band Assembly Replacement

Overview

Replacement

Removing the S-tension regulator band assembly
Cleaning S reel table assembly
Installing the S-tension regulator band assembly

Adjustments after replacement

S tension regulator operating position adjustment
FWD Back Tension adjustment
Tape run adjustment
Capstan add-on recording adjustment

Notes

If felt surface of the S-tension regulator band assembly becomes hardened, or worn out, replace the S-tension regulator band assembly as an entire assembly.

Preparations

1. Turn the POWER switch to OFF.
2. Remove the front lid and outside panel assembly. (Refer to Section 1-4.)
3. Remove the cassette compartment. (Refer to Section 1-9.)
4. Check that the unit is in the unthreading-end state.

Note

The stop washer is used to fix the tension regulator band assembly.
Prepare a new stop washer (3-559-408-11) when replacing the tension regulator band assembly.

Tools

• Stop washer fastening tool :	J-6323-530-A
• Cleaning cloth :	3-184-527-01
• Cleaning fluid :	9-919-573-01

Removal

1. Removing the S-tension regulator band assembly

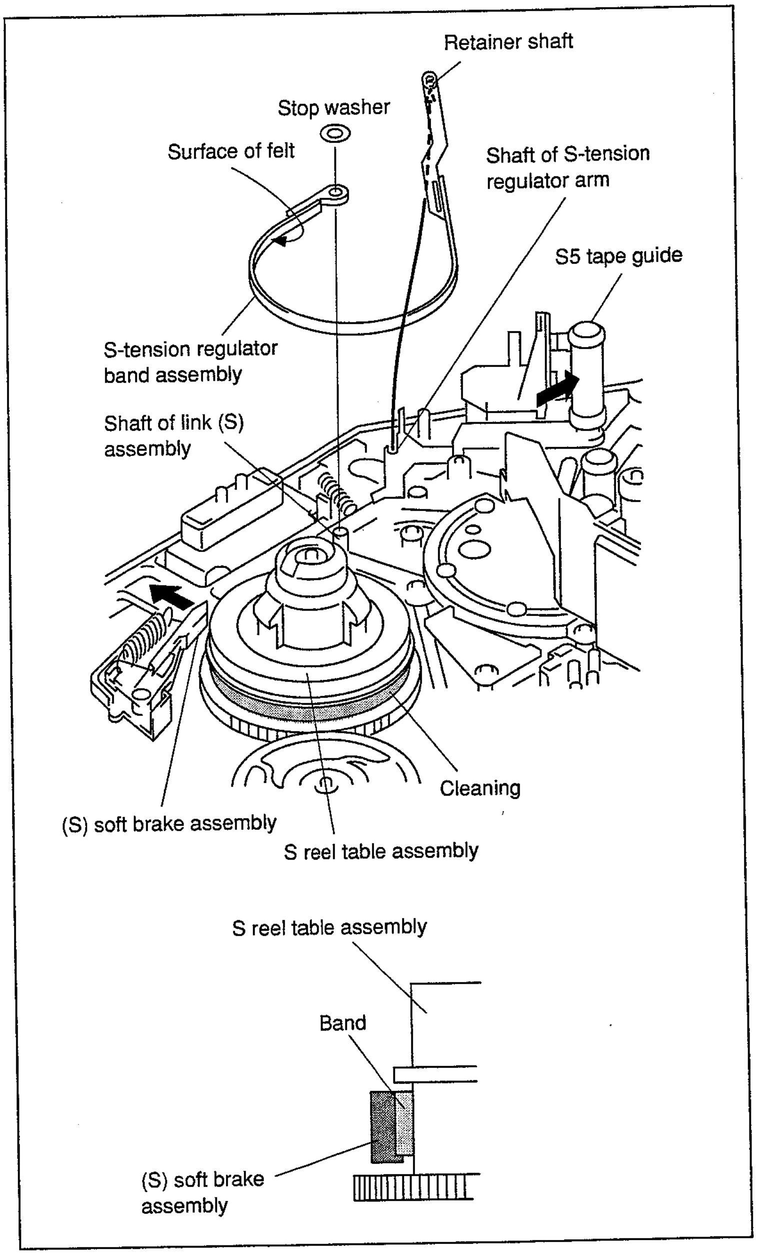
(1) Remove the stop washer of the S-tension regulator band assembly and remove it from the shaft of link (S) assembly.

Note

When removing the stop washer, be careful not to apply an excessive force to the S-tension regulator band assembly.

(2) Move the S5 tape guide of the S-tension regulator arm in the direction of the arrow, and remove the retainer shaft of the S-tension regulator band assembly from the shaft of S-tension regulator arm.

(3) While moving the (S) soft brake assembly out with finger, remove the S-tension regulator band assembly.


Retainer shaft
Stop washer
Surface of felt
Shaft of S-tension regulator arm
S5 tape guide
S-tension regulator band assembly
Shaft of link (S) assembly
Cleaning
(S) soft brake assembly
S reel table assembly
S reel table assembly
Band
(S) soft brake assembly

Installation

2. Cleaning S reel table assembly

Clean the surface that contacts the tension regulator band, of the S reel table assembly using a cleaning cloth moistened with cleaning fluid.

3. Installing the S-tension regulator band assembly

(1) Install the new S-tension regulator band assembly with its felt-side facing inside, by reversing the steps of removal.

Notes

- When installing it, be careful not to bend the S-tension regulator band assembly that results in damage.
- Do not touch the felt surface of the S-tension regulator band assembly hands. Also never attach oil on the felt surface.
- Check that the (S) soft brake assembly is pressing down the regulator band as shown.

(2) Attach the S-tension regulator band assembly using a new stop washer.

Note

When installing the stop washer, do not apply excessive force to the S-tension regulator band assembly.

Adjustments after Replacement

4. S tension regulator operating position adjustment

(Refer to Section 8-1-2.)

5. FWD back tension adjustment

(Refer to Section 8-1-3.)

6. Tape run adjustment

(Refer to Section 8-2-1.)

7. Capstan add-on recording adjustment

(Refer to Section 10-4-3.)

7-9. T-Tension Regulator Band Assembly Replacement

Overview

Replacement

Removing T-tension regulator band assembly
Cleaning the T reel table assembly
Installing T-tension regulator band assembly

Adjustments after replacement

T Tension regulator operating position adjustment
REV back tension adjustment
Tape run adjustment
Capstan add-on recording adjustment

Preparations

1. Turn the POWER switch to OFF.
2. Remove the front lid and outside panel assembly. (Refer to Section 1-4.)
3. Remove the cassette compartment. (Refer to Section 1-9.)
4. Check that the unit is in the unthreading-end state.

Note

When installing T-tension regulator band assembly, the two stop washers are used. Prepare the two new stop washers (3-559-408-11) when replacing it.

Tools

• Stop washer fastening tool :	J-6323-530-A
• Cleaning cloth :	3-184-527-01
• Cleaning fluid :	9-919-573-01

Removal

1. Removing T-tension regulator band assembly

(1) Remove the two stop washers.
(2) While moving the T soft brake away from the position with finger, remove T-tension regulator band assembly.

Installation

2. Cleaning the T reel table assembly

Clean the surface that contacts the tension regulator band, of the T reel table using a cleaning cloth moistened with cleaning fluid.

3. Installing T-tension regulator band assembly

(1) Hold the new T-tension regulator band assembly with its felt-side facing inside, install the new T-tension regulator band assembly to the shaft of eject link assembly (B).
(2) While holding the shaft of eject link assembly (B) from its bottom with a screwdriver, install the new T-tension regulator band assembly using new washer.

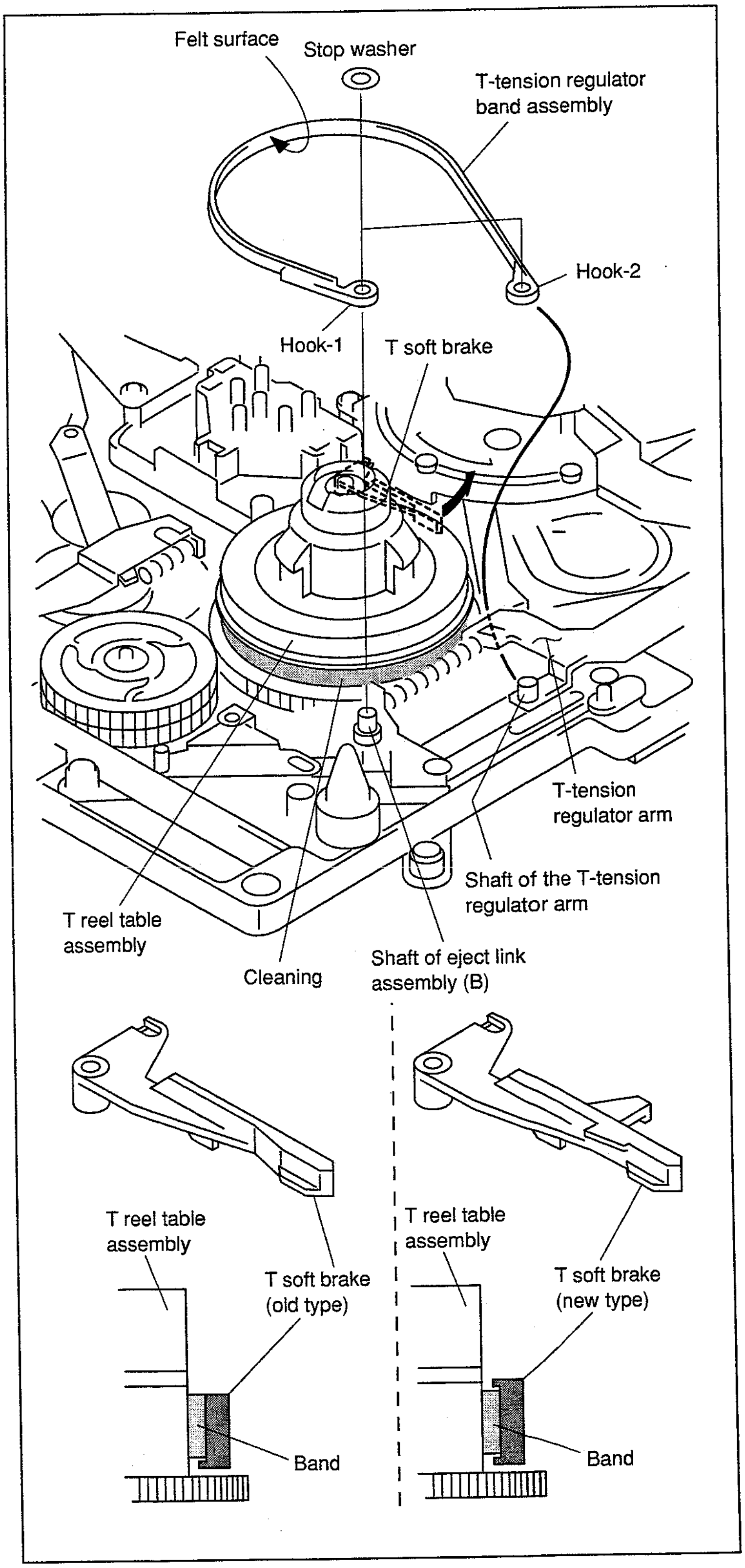
Note

When installing the stop washer, do not apply excessive force to T-tension regulator band assembly.

(3) While pushing the T soft brake away from its position with finger, install the hook-2 to the shaft by passing underneath the T-tension regulator arm.
(4) While pushing up the shaft of the T-tension regulator arm from its bottom, install T-tension regulator band assembly using a new stop washer.

Note

When installing the stop washer, do not apply excessive force to T-tension regulator band assembly.


Felt surface
Stop washer
T-tension regulator band assembly
Hook-2
Hook-1
T soft brake
T-tension regulator arm
Shaft of the T-tension regulator arm
T reel table assembly
Cleaning
Shaft of eject link assembly (B)
T reel table assembly
T soft brake (old type)
Band
T reel table assembly
T soft brake (new type)
Band

Notes

- When installing it, be careful not to bend T-tension regulator band assembly that results in damage.
- Do not touch the felt surface of the T-tension regulator band assembly hands. Also never attach oil on the felt surface.
- Check that the T soft brake is pressing down the regulator band as shown.

Adjustments after replacement

4. T tension regulator operating position adjustment

(Refer to Section 8-1-6.)

5. REV back tension adjustment

(Refer to Section 8-1-4.)

6. Tape run adjustment

(Refer to Section 8-2-1.)

7. Capstan add-on recording adjustment

(Refer to Section 10-4-3.)

7-10. Timing Belt Replacement

Overview

Replacement

Removing the timing belt
Cleaning the pulley
Installing the timing belt

Adjustments after replacement

Timing belt tension adjustment
Capstan add-on recording adjustment

Preparations

1. Turn the POWER switch to OFF.
2. Open the inside panel. (Refer to Section 1-5.)
3. Removing the plug-in boards (Refer to Section 1-7.)
4. Removing the SS-92 board (Refer to Section 6-20.)

Note

Timing belt can be replaced when the mechanical deck assembly attaches to the unit.

Tools

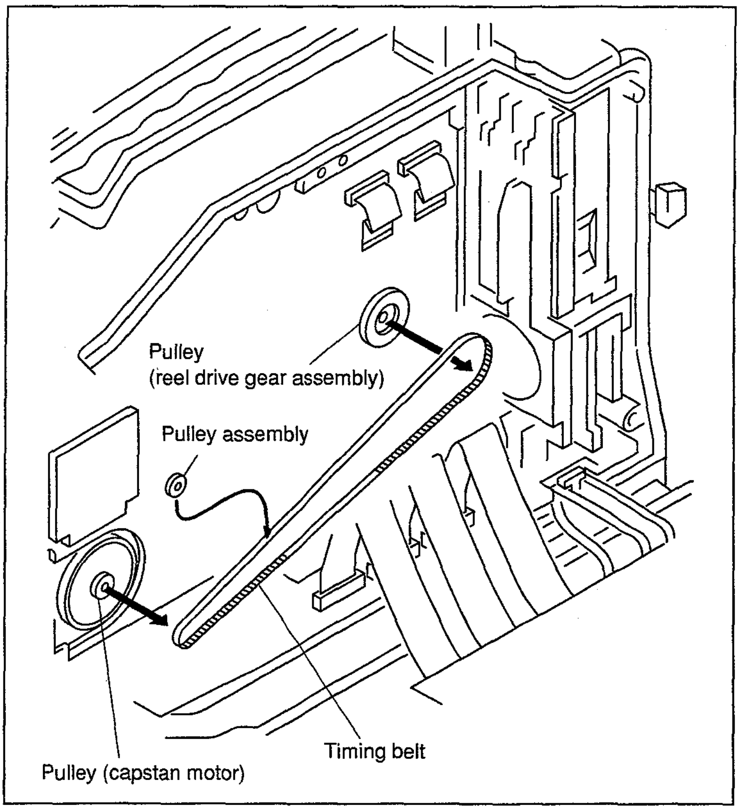
- Torque screwdriver bit (for M1.4) : J-6325-110-A
- Torque screwdriver (for 3 kg) : J-6325-400-A

Removal

1. Removing the timing belt

(1) Remove the timing belt from the pulley assembly.

(2) Remove the timing belt from pulleys of the capstan motor and the reel drive gear assembly.


Pulley
(reel drive gear assembly)
Pulley assembly
Pulley (capstan motor)
Timing belt

Installation

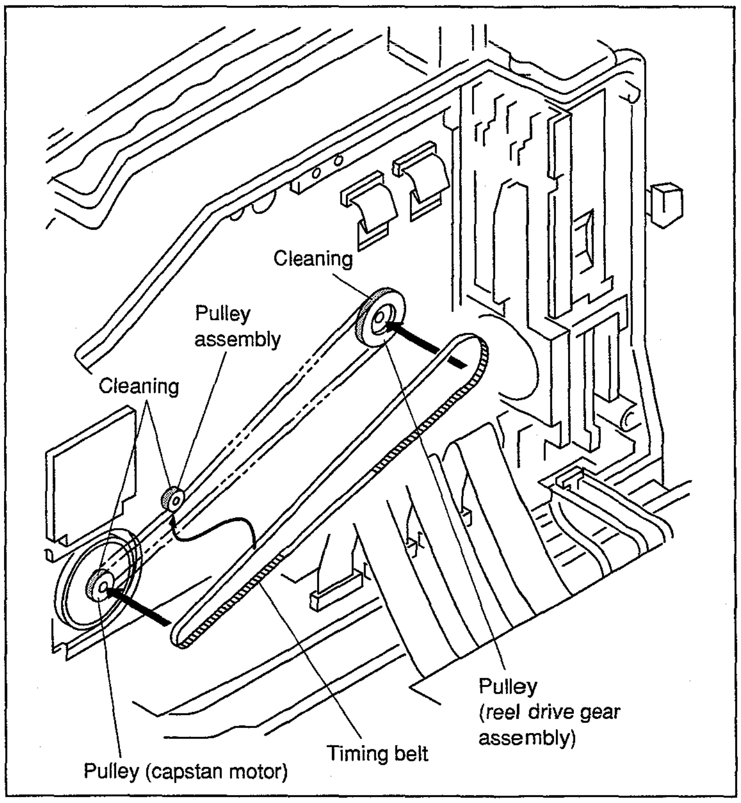
2. Cleaning the pulley

Clean the pulleys and the pulley assemblies of the capstan motor and the reel drive gear assembly using a cleaning cloth moistened with cleaning fluid.

3. Installing the timing belt

(1) Engage the timing belt on the pulleys of the capstan motor and the reel drive gear assembly.

(2) Engage the timing belt on the pulley assembly.


Cleaning
Pulley
assembly
Cleaning
Pulley
(reel drive gear
assembly)
Timing belt
Pulley (capstan motor)

Adjustments after Replacement

4. Timing belt tension adjustment

(Refer to Section 8-1-5.)

5. Capstan add-on recording adjustment

(Refer to Section 10-4-3.)

7-11. S Idler Assembly Replacement and T Idler Assembly Replacement

Overview

Replacement

Removing the S or T idler assembly
Cleaning and applying oil to the mount shaft
Installing the S or T idler assembly

Adjustment after replacement

Capstan add-on recording adjustment

Note

The S idler assembly and the T idler assembly are the different parts, but the same replacement procedure apply to both of them.

Preparations

1. Turn the POWER switch to OFF.
2. Remove the front lid and outside panel assembly. (Refer to Section 1-4.)
3. Remove the cassette compartment. (Refer to Section 1-9.)

Note

The stop washer is used to fix the S and T idler assemblies.
Prepare a new stop washer (3-559-408-11) when replacing the S and T idler assemblies.

Tools

• Torque screwdriver bit (for M1.4) :	J-6325-110-A
• Torque screwdriver (for 3 kg) :	J-6325-400-A
• Stop washer fastening tool :	J-6323-530-A
• Cleaning cloth:	3-184-527-01
• Cleaning fluid:	9-919-573-01
• Oil :	7-661-018-18

Removal

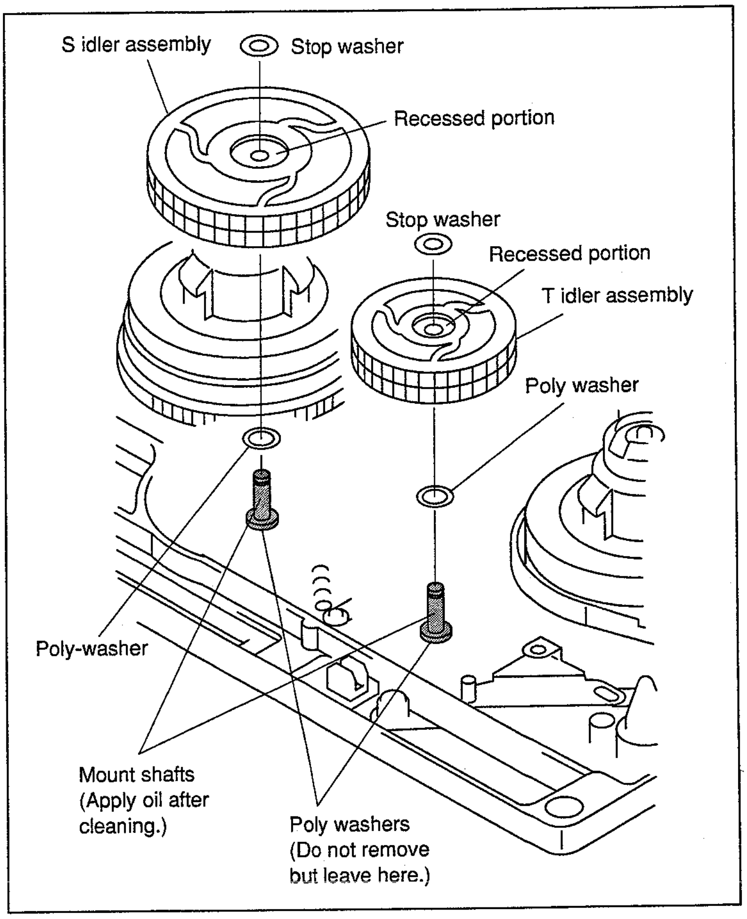
1. Removing the S or T idler assembly

Remove the stop washer and remove the S or T idler assembly.

Note

Do not remove the poly-washers that are inserted under the S or T idler assembly, from the mount shaft.

There are cases that the poly-washers are removed together with the idler assembly when the idler assembly is removed. Do not lose the poly-washers.


S idler assembly
Stop washer
Recessed portion
Stop washer
Recessed portion
T idler assembly
Poly washer
Poly-washer
Mount shafts
(Apply oil after cleaning.)
Poly washers
(Do not remove but leave here.)

Installation

2. Cleaning and applying oil to the mount shaft

(1) Clean the mount shaft using a cleaning cloth moistened with cleaning fluid.
(2) Applying 1/4 drop of oil to the mount shaft.

3. Installing the S or T idler assembly

(1) Hold the new S or T idler assembly with its protruded side facing up, and insert it to the mount shaft.
(2) Install the new stop washer.

Adjustment after Replacement

4. Capstan add-on recording Adjustment

(Refer to Section 10-4-3.)

7-12. CTL Head Replacement

Overview

Replacement

Removing the FE/CTL head assembly
CTL Head replacement
Installing the FE/CTL head assembly
Cleaning FE/CTL head assembly

Adjustments after replacement

Tape run adjustment
Video tracking adjustment
CTL head height adjustment
CTL head position adjustment
TC head position adjustment

CAUTION

The tape cleaner that is attached to the FE head has the cleaning blade.
The cleaning blade has the sharp edge that can cut your hands. Never touch the cleaning blade with bare hands. Be careful also not to cut your hands during CTL head replacement and adjustments.

Preparations

1. Check that the unit is in the unthreading-end state.
2. Turn the POWER switch to OFF.
3. Remove the front lid and outside panel assembly. (Refer to Section 1-4.)

   Note

   The CTL head can be replaced when the cassette compartment attaches to the unit.

Tools

• Torque screwdriver bit (for M2) :	J-6325-380-A
• Torque screwdriver (for 3 kg) :	J-6325-400-A
• Cleaning cloth :	3-184-527-01
• Cleaning fluid :	9-919-573-01

Removal

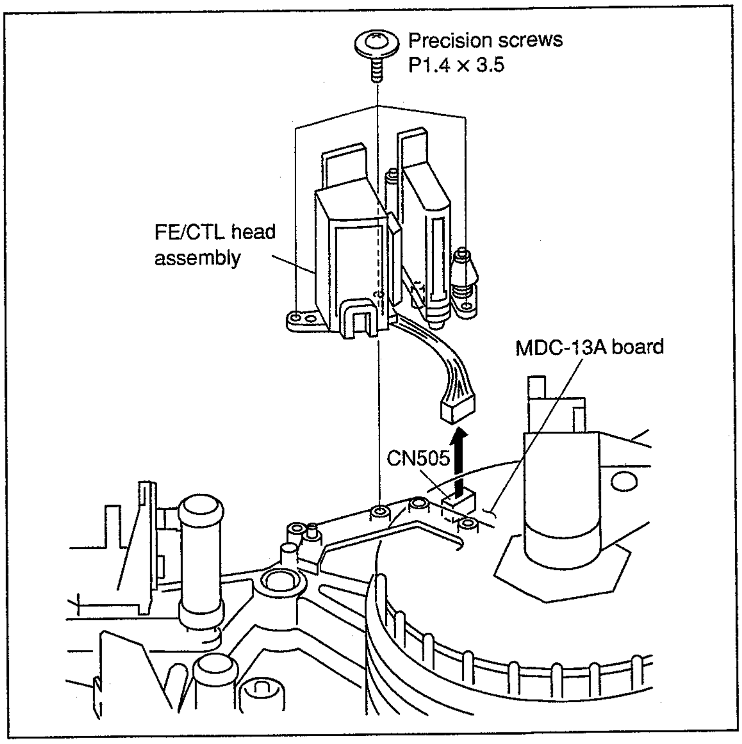
1. Removing the FE/CTL head assembly

(1) Remove the connector CN505 on the MDC-13A board.

(2) Remove the three precision screws and remove the FE/CTL head assembly from the unit.

Note

Be careful not to touch the screwdriver against the video head, drum, erase head, tape guide and other parts.


Precision screws
P1.4 x 3.5
FE/CTL head assembly
MDC-13A board
CN505

2. CTL head replacement

(1) Remove soldering from the two wires that are connected to the head.

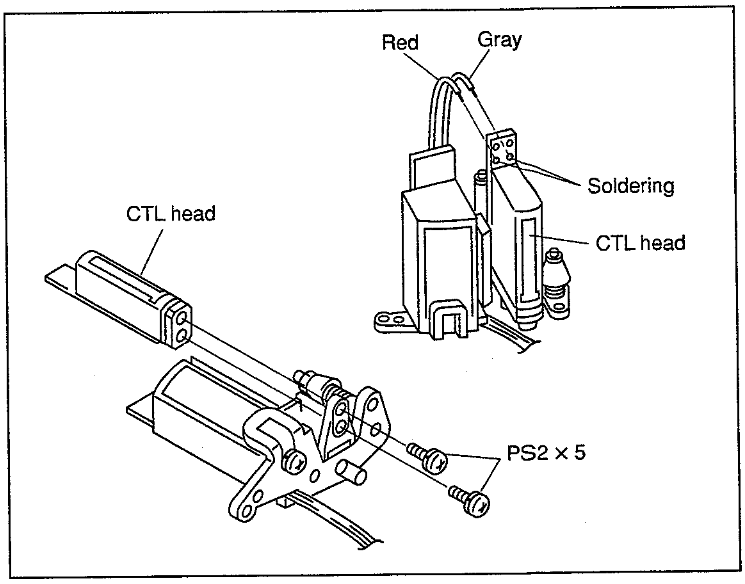
(2) Remove the two screws on the rear of the CTL head and remove the CTL head.

(3) Clean the contact surface and install the new CTL head with two screws.
The standard tightening torque value :
20×10^{-2} N•m (2 kgf•cm)

(4) Connect the two wires to the printed wiring board of the CTL head. (Refer to (1) of step 2 of "Removal".)

Note

Never make mistake of colors and connections of the wires when soldering them. Any mistake results in severe troubles of tape interchangeability.

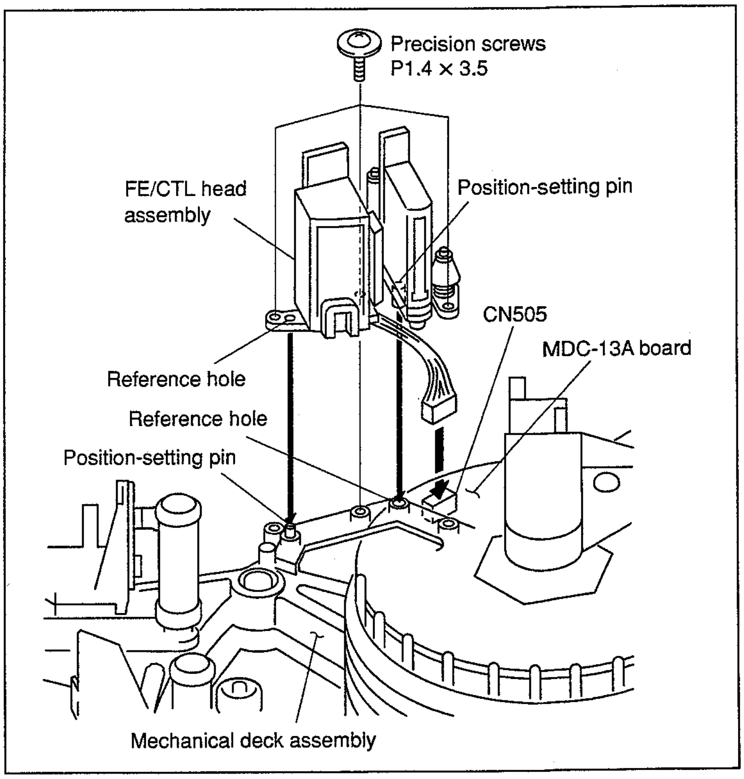

Red
Gray
Soldering
CTL head
CTL head
PS2 x 5

Installation

3. Installing the FE/CTL head assembly

(1) Align the respective position-setting pins with the reference holes of the FE/CTL head assembly with the mechanical deck assembly, and install the FE/CTL head assembly with the three precision screws.
The standard tightening torque value :
10×10^{-2} N•m (1 kgf•cm)

(2) Connect the harness of the FE/CTL head assembly to the connector CN505 on the MDC-13A board.


Precision screws
P1.4 × 3.5
FE/CTL head assembly
Position-setting pin
CN505
MDC-13A board
Reference hole
Reference hole
Position-setting pin
Mechanical deck assembly

4. Cleaning FE/CTL head assembly

Clean the CTL head, FE head, tape cleaner and tape guide using a cleaning cloth moistened with cleaning fluid.

Note

After cleaning, be sure to wipe the cleaning fluid off the cleaned portions using a dry cleaning cloth.

Adjustments after Replacement

5. Tape run adjustment

(Refer to Section 8-2-1.)

6. Video tracking adjustment

(Refer to Section 8-2-2.)

7. CTL head height adjustment

(Refer to Section 8-2-3.)

8. CTL head position adjustment

(Refer to Section 8-2-4.)

9. TC head position adjustment

(Refer to Section 8-2-6.)

7-13. FE Head Replacement

Overview

Replacement

Removing the FE/CTL head assembly
FE head replacement
Installing the FE/CTL head assembly
Cleaning FE/CTL head assembly

Adjustment after replacement

Tape run adjustment

CAUTION

The tape cleaner that is attached to the FE head has the cleaning blade.
The cleaning blade has the sharp edge that can cut your hands. Never touch the cleaning blade with bare hands. Be careful also not to cut your hands during CTL head replacement and adjustments.

Preparations

1. Check that the unit is in the unthreading-end state.
2. Turn the POWER switch to OFF.
3. Remove the front lid and outside panel assembly. (Refer to Section 1-4.)

Note

The FE head can be replaced when the cassette compartment attaches to the unit.

Tools

• Torque screwdriver bit (for M2) :	J-6325-380-A
• Torque screwdriver (for 3 kg) :	J-6325-400-A
• Cleaning cloth :	3-184-527-01
• Cleaning fluid :	9-919-573-01

Removal

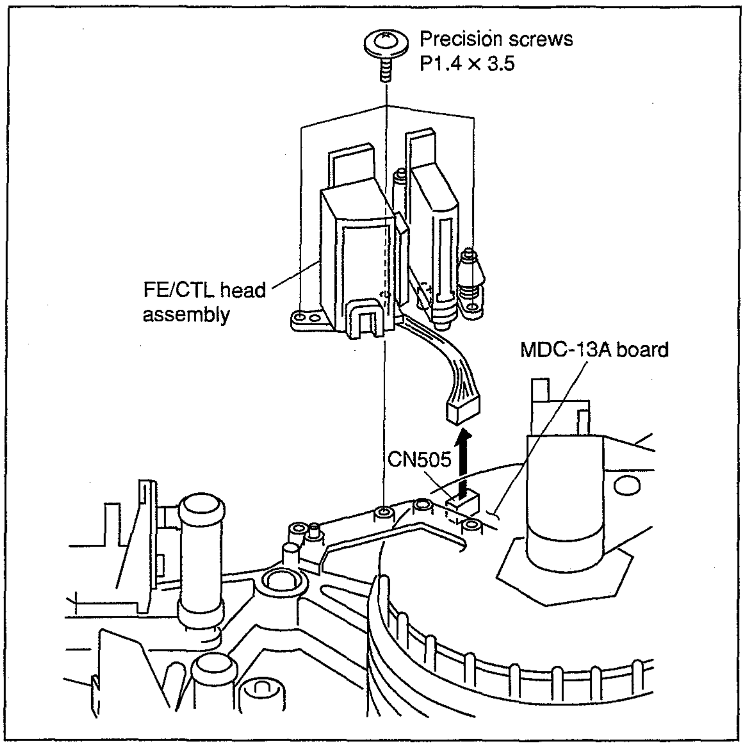
1. Removing the FE/CTL head assembly

(1) Remove the connector CN505 on the MDC-13A board.

(2) Remove the three precision screws and remove the FE/CTL head assembly from the unit.

Note

Be careful not to touch the screwdriver against the video head, drum, erase head, tape guide and other parts.


Precision screws
P1.4 × 3.5
FE/CTL head
assembly
MDC-13A board
CN505

2. FE head replacement

(1) Remove soldering from the two wires that are connected to the FE head.

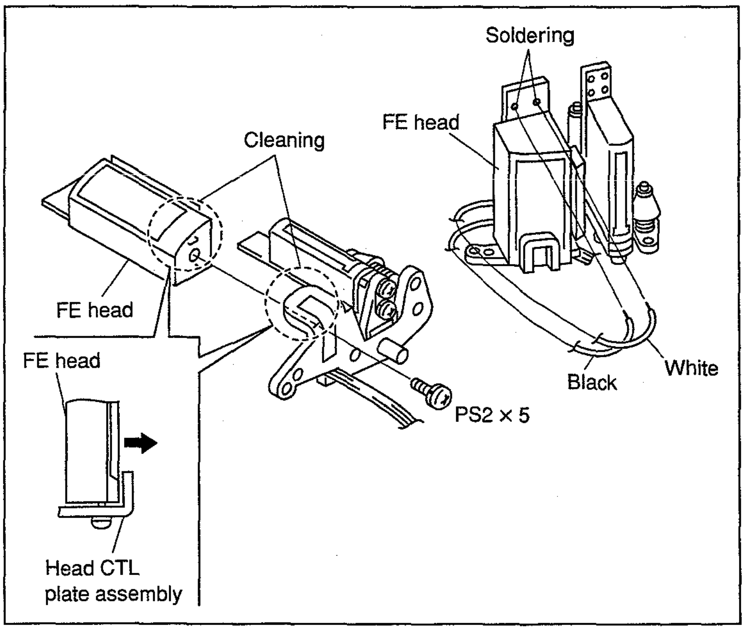
(2) Remove the screw from the rear of the FE head and remove the FE head.

(3) Clean the contact surface. Push the new FE head toward the Head CTL plate assembly as for as it can go, and fix it with screw.
The standard tightening torque value :
20×10^{-2} N•m (2 kgf•cm)

(4) Solder the two wires to the printed wiring boards of the FE head. (Refer to (1) of step 2 of "Removal".)

Note

Never make mistake of colors and connections of the wires when soldering them.

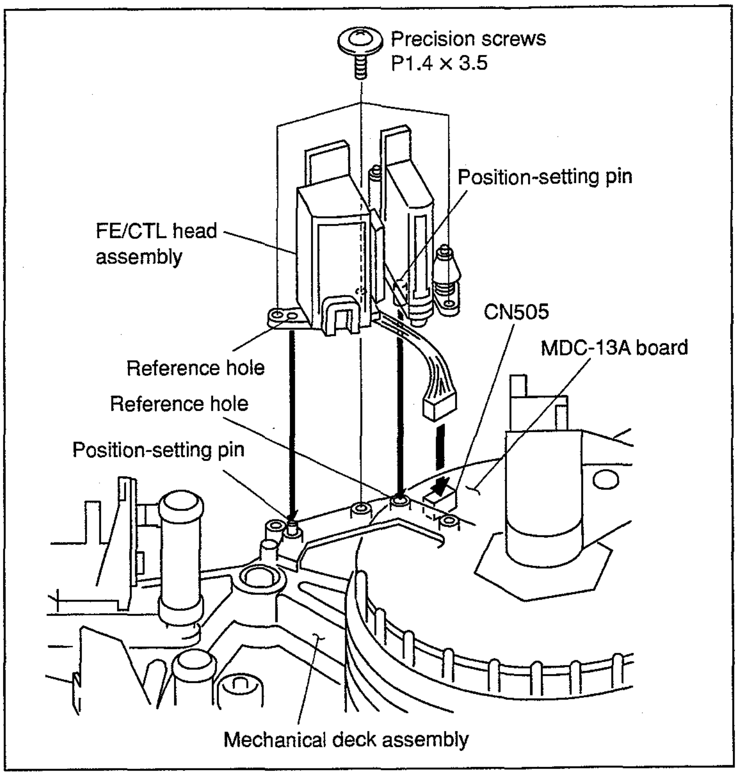

Soldering
FE head
Cleaning
FE head
FE head
Head CTL
plate assembly
Black
White
PS2 × 5

Installation

3. Installing the FE/CTL head assembly

(1) While aligning the position-setting pins of the new full FE/CTL head assembly with the reference holes of the mechanical deck assembly respectively, install the FE/CTL head assembly with three precision screws.
The standard tightening torque value :
10×10^{-2} N•m (1 kgf•cm)

(2) Connect the harness of the FE/CTL head assembly to the connector CN505 on the MDC-13A board.


Precision screws
P1.4 × 3.5
Position-setting pin
FE/CTL head assembly
CN505
MDC-13A board
Reference hole
Reference hole
Position-setting pin
Mechanical deck assembly

4. Cleaning FE/CTL head assembly

Clean the CTL head, FE head, tape cleaner and tape guide using a cleaning cloth moistened with cleaning fluid.

Note

After cleaning, be sure to wipe the cleaning fluid off the cleaned portions using a dry cleaning cloth.

Adjustment after Replacement

5. Tape run adjustment

(Refer to Section 8-2-1.)

7-14. Holder Assembly Sensor (REC) Replacement

Overview

Replacement

Removing the holder assembly sensor (REC)
Installing the holder assembly sensor (REC)
Operation check

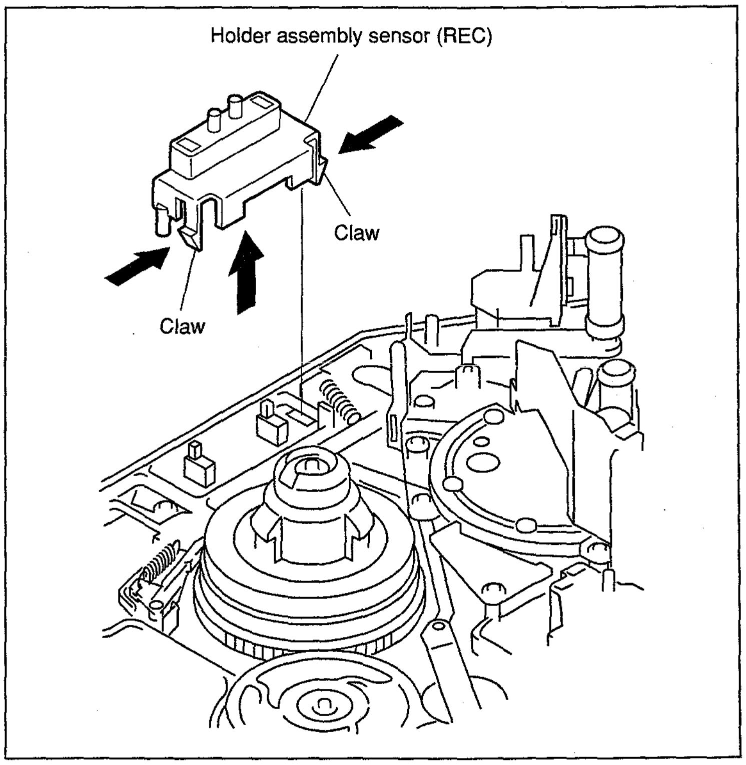
Preparations

1. Turn the POWER switch to OFF.
2. Remove the front lid and outside panel assembly. (Refer to Section 1-4.)
3. Remove the cassette compartment. (Refer to Section 1-9.)

Removal

1. Removing the holder assembly sensor (REC)

While holding down the two claws with a pair of tweezers, remove the holder assembly sensor (REC) by pulling it up.



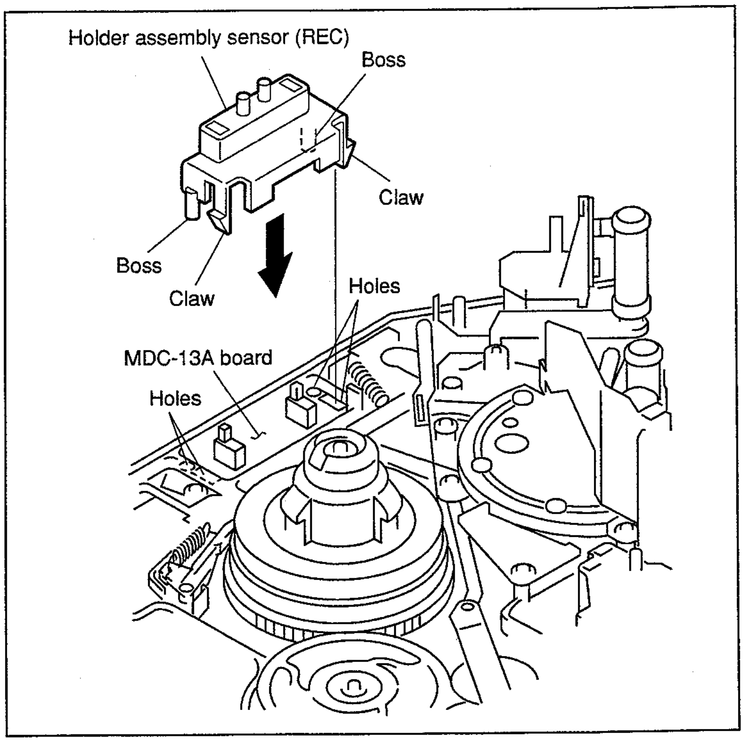
Installation

2. Installing the holder assembly sensor (REC)

Insert the bosses and claws of the new holder assembly sensor (REC) into four holes of the MDC-13A board and install the new holder assembly sensor (REC).

3. Operation check

Check that the detection pin moves up and down smoothly, and returns to the original position.


Holder assembly sensor (REC)
Boss
Claw
Boss
Claw
Holes
MDC-13A board
Holes

7-15. End Sensor Assembly Replacement

Overview

Replacement

Removing the end sensor assembly
Installing the end sensor assembly

Preparations

1. Check that the unit is in the unthreading-end state.
2. Turn the POWER switch to OFF.
3. Remove the front lid and outside panel assembly. (Refer to Section 1-4.)

Note

End sensor assembly can be replaced when the cassette compartment attaches to the unit.

Tools

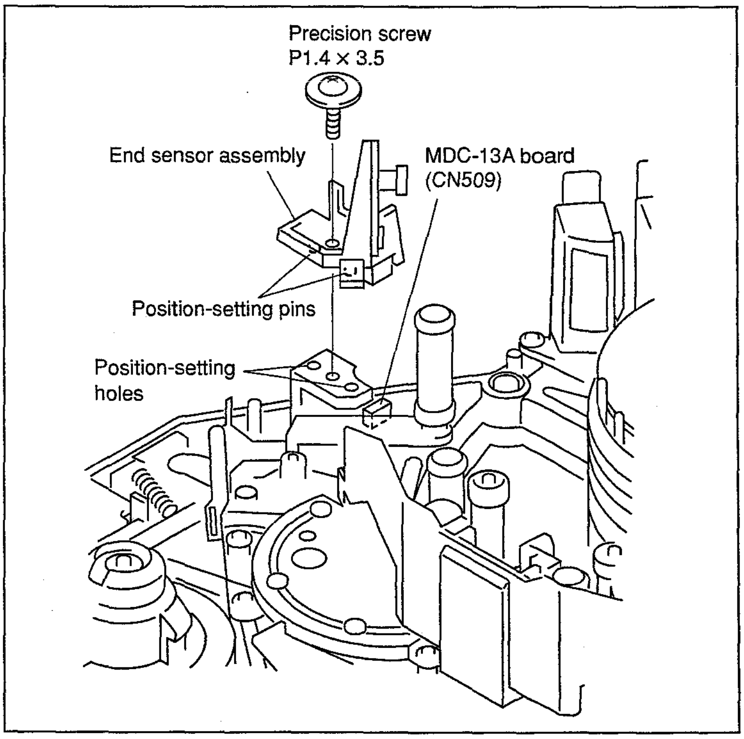
- Torque screwdriver bit (for M1.4) : J-6325-110-A
- Torque screwdriver (for 3 kg) : J-6325-400-A

Removal

1. Removing the end sensor assembly

(1) Remove the precision screw fixing the end sensor assembly.

(2) While removing the connector CN509 on the MDC-13A board, remove the end sensor assembly.



Installation

2. Installing the end sensor assembly

(1) While aligning the two position-setting pins on the bottom of the end sensor assembly with the reference holes of the MD frame respectively, connect the end sensor assembly connector CN509 on the MDC-13A board.

(2) Install the new end sensor assembly with the precision screw.
The standard tightening torque value :
10×10^{-2} N•m (1 kgf•cm)

7-16. Full Top Sensor Assembly Replacement

Overview

Replacement

Removing the full top sensor assembly
Installing the full top sensor assembly

Preparations

1. Check that the unit is in the unthreading-end state.
2. Turn the POWER switch to OFF.
3. Remove the front lid and outside panel assembly. (Refer to Section 1-4.)

Note

The full top sensor assembly can be replaced when the cassette compartment attaches to the unit.

Tools

- Torque screwdriver bit (for M1.4) : J-6325-110-A
- Torque screwdriver (for 3 kg) : J-6325-400-A

Removal

1. Removing the full top sensor assembly

(1) Remove the precision screw that fixes the full top sensor assembly.

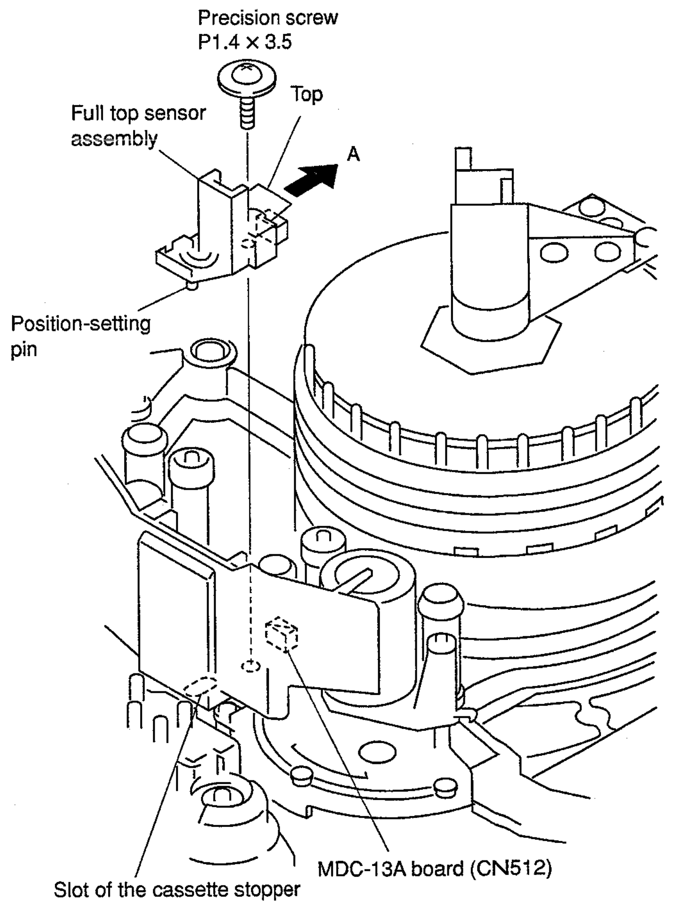
(2) While removing the connector CN512 on the MDC-13A board, remove the full top sensor assembly.

Installation

2. Installing the full top sensor assembly

(1) While aligning the position-setting pin on the bottom of the new full top sensor assembly with the slot of the cassette stopper, connect the connector to CN512 on the MDC-13A board.

(2) Push the full top sensor in the direction allow of A until top of the full top sensor holder contacts the lower drum surface and install the full top sensor with the precision screw.
The standard tightening torque value :
10×10^{-2} N•m (1 kgf•cm)



7-17. S1, T1, T3 Tape Guide Replacement

Because the T4 tape guide is fixed, it cannot be replaced. Do not rotate the upper flange with excessive force.
Replace the following tape guides in units of block.

- S2 tape guide (Refer to Section 7-32.)
- S3/S4 tape guide (Refer to Section 7-30.)
- S5 tape guide (Refer to Section 7-21.)
- T2 tape guide (Refer to Section 7-33.)
- T5 Tape guide (Refer to Section 7-22.)

Overview

Replacement

Removing the tape guide
Installing the tape guide
Cleaning of tape guide

Adjustment after Replacement

Tape guide height adjustment

Notes

- The tape guides have the various shape, but the same replacement procedure apply to all of them.
- When two or more tape guides are going to be replaced, replace tape guides one guide after another and perform adjustment at every replacement. Adjusting the two or more tape guides at the same time is extremely difficult.
- The set screws on top of each tape guide must be tightened with the following tightening torque.
  The standard tightening torque value : 9×10^{-2} N•m (0.9 kgf•cm)

Preparations

1. Turn the POWER switch to OFF.
2. Remove the front lid and outside panel assembly. (Refer to Section 1-4.)
3. Remove the cassette compartment. (Refer to Section 1-9.)

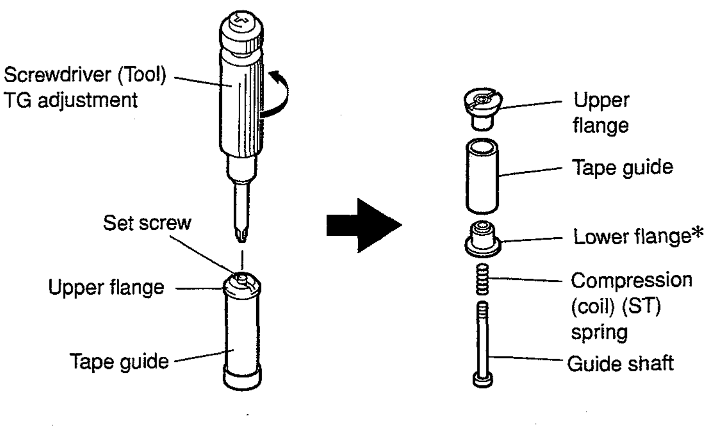
Tools

• Screwdriver (tool) TG adjustment (45) :	J-6322-420-B
• Torque screwdriver bit (for M2) :	J-6325-380-A
• Torque screwdriver (for 3 kg) :	J-6325-400-A
• Cleaning cloth :	3-184-527-01
• Cleaning fluid :	9-919-573-01

Removal

1. Removing the tape guide

(1) Install the screwdriver (Tool) TG adjustment on top of the upper flange as shown.
Loosen the set screw on top of tape guide by rotating it by 1/4 turn counter-clockwise.
(2) Rotate the knob of the screwdriver (Tool) TG adjustment itself counter-clockwise and remove the upper flange.
(3) Remove the tape guide.
At this point, the lower flange and the compression (coil) (ST) spring can be removed.


Screwdriver (Tool) TG adjustment
Set screw
Upper flange
Tape guide
Upper flange
Tape guide
Lower flange*
Compression (coil) (ST) spring
Guide shaft

* : The T3 tape guide of the pinch arm assembly has no lower flange.

Installation

2. Installing the tape guide

(1) Install the compression (coil) (ST) spring to the guide shaft.
(2) Install the lower flange to the guide shaft.
(3) Install the tape guide to the guide shaft.
(4) Screw-in the upper flange to the guide shaft as far as it can go.

Note

When the upper flange or the set screw is replaced, establish the state that the set screw exceeds the top surface of the upper flange by 0.4 mm for the S1 and T1 tape guides and 0.6 mm for the T3 tape guide. Then perform step (4).

3. Cleaning of tape guide

Clean the tape guide using a cleaning cloth moistened with cleaning fluid.

Note

After cleaning, be sure to wipe the cleaning fluid off the cleaned portions using a dry cleaning cloth.

Adjustment after Replacement

4. Tape guide height adjustment

(Refer to Section 8-2-1.)

7-18. (S) Soft Brake Assembly Replacement

Overview

Replacement

Removing the (S) soft brake assembly replacement
Installing the (S) soft brake assembly replacement

Adjustment after replacement

Capstan add-on recording adjustment

Note

If a tape hunts or slackens during the REW mode, replace the (S) soft brake assembly.

Preparations

1. Turn the POWER switch to OFF.
2. Remove the front lid and outside panel assembly. (Refer to Section 1-4.)
3. Remove the cassette compartment. (Refer to Section 1-9.)
4. Check that the unit is in the unthreading-end state.

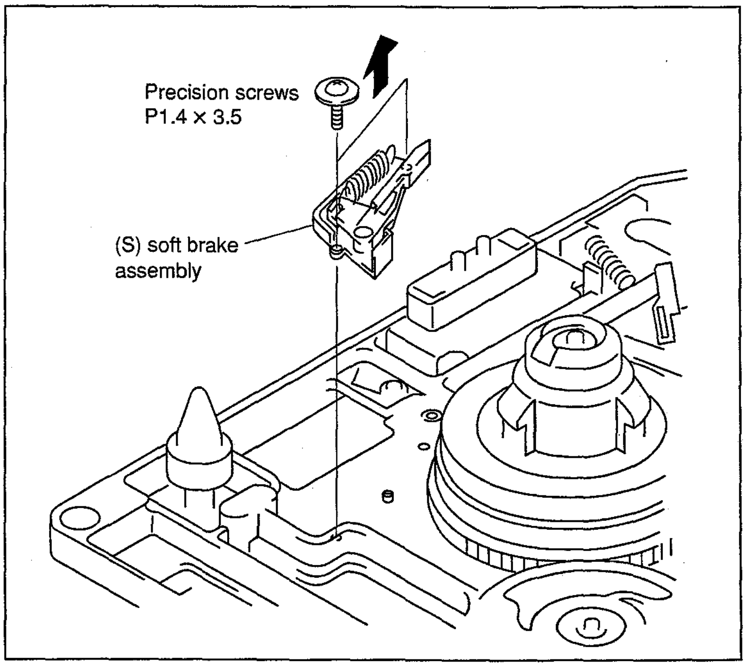
Tools

- Cleaning cloth : 3-184-527-01
- Cleaning fluid : 9-919-573-01

Removal

1. Removing the (S) soft brake assembly replacement

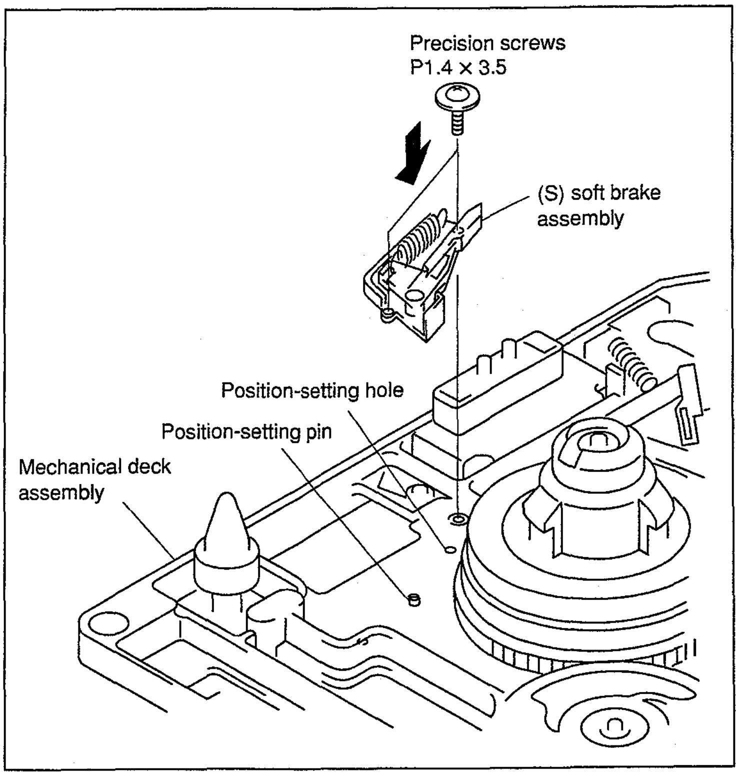
Remove the two precision screws and the (S) soft brake assembly.



Installation

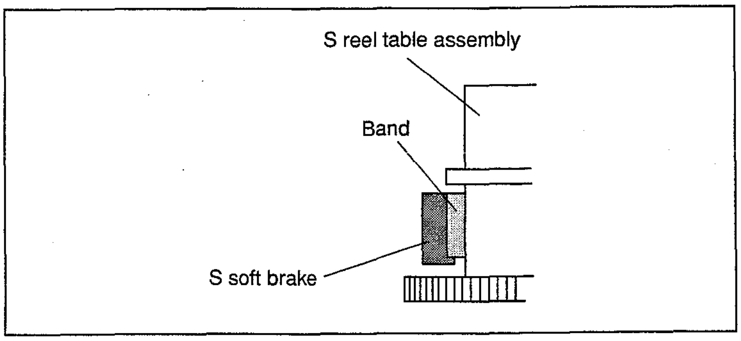
2. Installing the (S) soft brake assembly

(1) Align the position-setting pin and the position-setting hole of the mechanical deck assembly, and fix it with two screws.
The standard tightening torque value :
10×10^{-2} N•m (1 kgf•cm)


Precision screws
P1.4 × 3.5
(S) soft brake assembly
Position-setting hole
Position-setting pin
Mechanical deck assembly

Note

Check that the S soft brake assembly arm is pressing the band as shown.


S reel table assembly
Band
S soft brake

Adjustment after Replacement

3. Capstan add-on recording adjustment

(Refer to Section 10-4-3.)

7-19. T Soft Brake Replacement

Overview

Replacement

Removing the T soft brake
Installing the T soft brake

Adjustment after replacement

Capstan add-on recording adjustment

Note

Two types of T-soft brake are used depending on the production time.

Preparations

1. Check that the unit is in the unthreading-end state.
2. Turn the POWER switch to OFF.
3. Remove the front lid and outside panel assembly. (Refer to Section 1-4.)

Note

The T Soft Brake can be replaced when the cassette compartment attaches to the unit.

Note

The stop washer is used to fix the T soft brake.
Prepare a new stop washer (3-559-408-11) when replacing it.

Tools

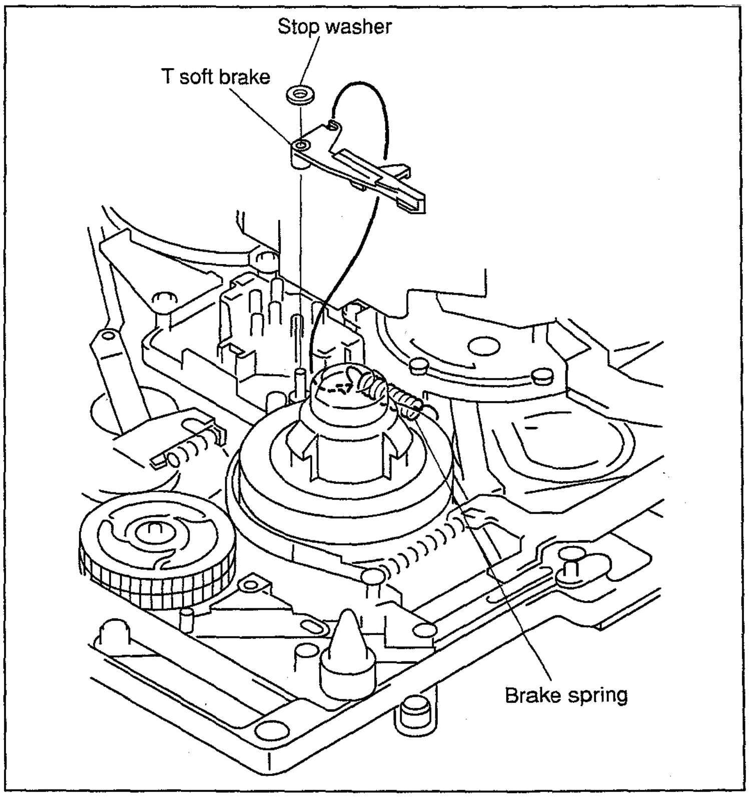
• Stop washer fastening tool :	J-6323-530-A
• Cleaning cloth :	3-184-527-01
• Cleaning fluid :	9-919-573-01

Removal

1. Removing the T soft brake

(1) Remove the extension spring from the T soft brake.

(2) Remove the stop washer and remove the T soft brake.

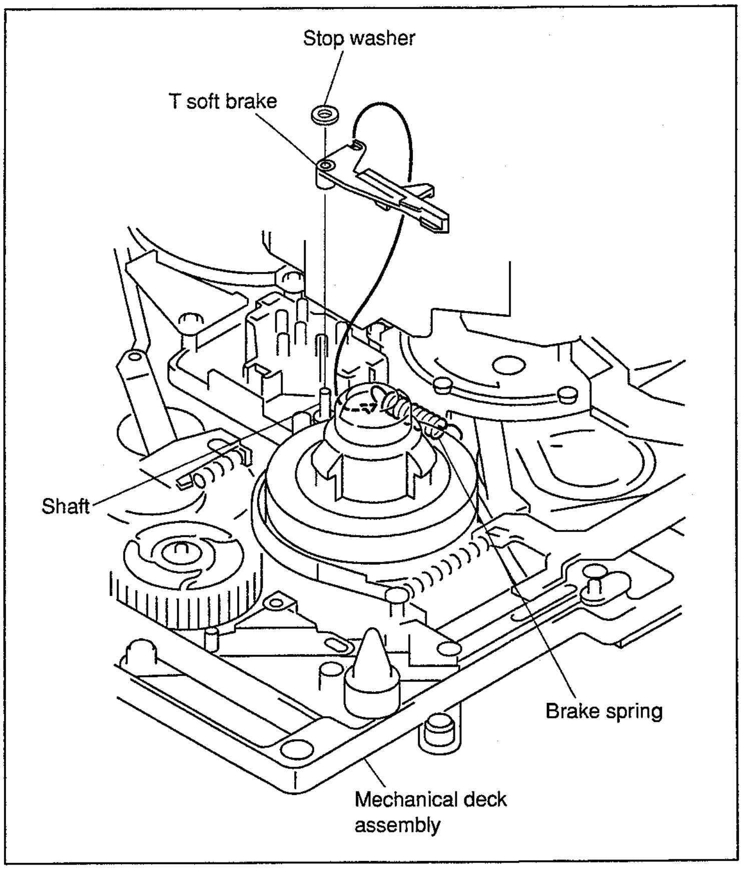


Installation

2. Installing the T soft brake

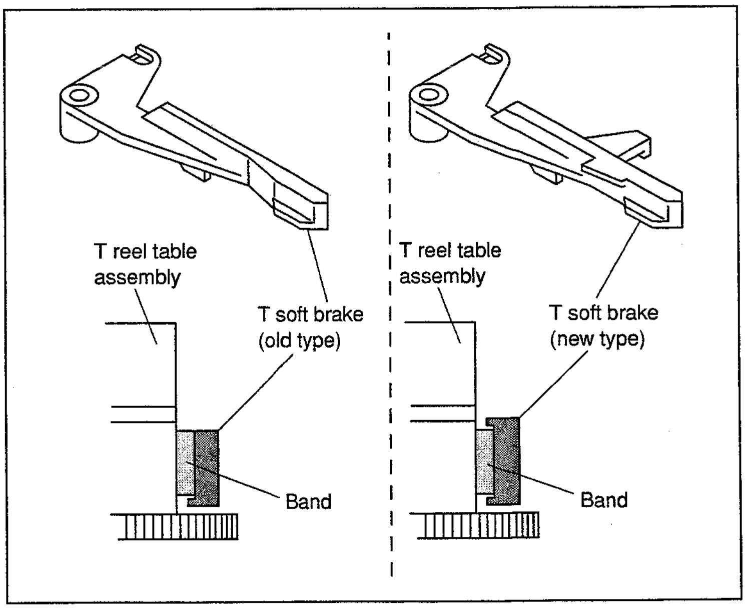
(1) Install the new T soft brake arm to the shaft of mechanical deck assembly and fix it with the new stop washer.

(2) Install the extension spring that is removed in step 1 (1).


Stop washer
T soft brake
Shaft
Brake spring
Mechanical deck assembly

Note

Check that the T soft brake is pressing down the band as shown.


T reel table assembly
T soft brake (old type)
Band
T reel table assembly
T soft brake (new type)
Band

Adjustment after Replacement

3. Capstan add-on recording adjustment

(Refer to Section 10-4-3.)

7-20. Manual Eject Assembly Replacement

Overview

Replacement

Removing the manual eject assembly
Installing the manual eject assembly
Operation check

Preparations

1. Check that the unit is in the unthreading-end state.
2. Turn the POWER switch to OFF.
3. Remove the front lid and outside panel assembly. (Refer to Section 1-4.)

Note

Manual eject assembly can be replaced when the cassette compartment attaches to the unit.

Tools

- Torque screwdriver bit (for M1.4) : J-6325-110-A
- Torque screwdriver (for 3 kg) : J-6325-400-A

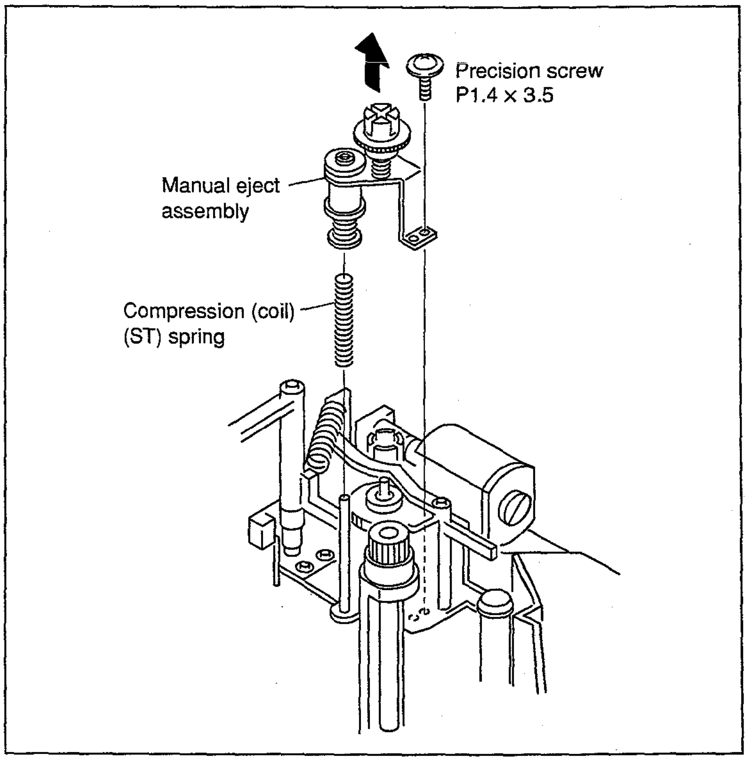
Removal

1. Removing the manual eject assembly

Remove the precision screw and manual eject assembly in the direction of the arrow.

Note

The mount shaft contains the compression (coil) (ST) spring inside. Be careful not to lose it.



Installation

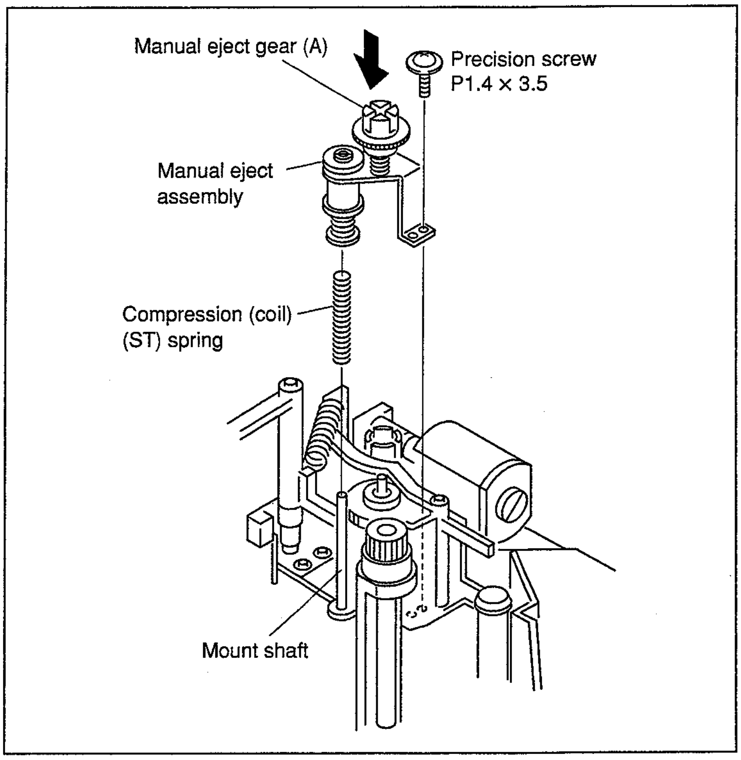
2. Installing the manual eject assembly

Install the new compression (coil) (ST) spring and the new manual eject assembly into the mount shaft and fix it with precision screw.
The standard tightening torque value :
10×10^{-2} N•m (1 kgf•cm)

3. Operation check

(1) Check that the manual eject gear (A) returns when it is pressed once and then depressed.

(2) Push in the manual eject gear (A) and then rotate it. Check that it moves smoothly.


Manual eject gear (A)
Precision screw
P1.4 × 3.5
Manual eject assembly
Compression (coil) (ST) spring
Mount shaft

7-21. S-Tension Regulator Assembly Replacement

Overview

Replacement

Moving the S3 tape guide
Removing the S-tension regulator band assembly
Removing the end sensor assembly
Removing the S-tension regulator assembly
Installing the S-tension regulator assembly
Installing the S-tension regulator band assembly
Installing the end sensor assembly
Cleaning of tape guide of S-tension regulator arm (S5)
Moving the S3 tape guide

Adjustments after replacement

S-Tension regulator operating position adjustment
FWD back tension adjustment
Tape run adjustment
Capstan add-on recording adjustment

Preparations

1. Turn the POWER switch to OFF.
2. Remove the front lid and outside panel assembly. (Refer to Section 1-4.)
3. Remove the cassette compartment. (Refer to Section 1-9.)
4. Check that the unit is in the unthreading-end state.

Tools

- Torque screwdriver bit (for M1.4) : J-6325-110-A
- Torque screwdriver (for 3 kg) : J-6325-400-A
- Torque cassette (FWD back tension) : J-6323-890-A
- Cleaning cloth : 3-184-527-01
- Cleaning fluid : 9-919-573-01

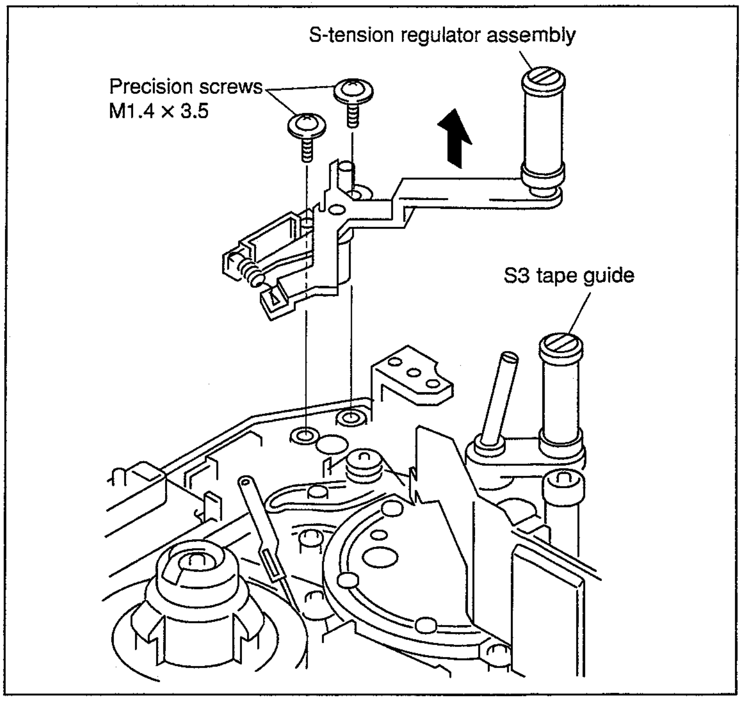
Note

The S-tension regulator assembly has the built-in plate spring and requires periodic applying grease.
Refer to Section 2-2-4 for applying grease to the plate spring.

Removal

1. Moving the S3 tape guide

Rotate the manual eject gear (A) counter-clockwise until the S3 tape guide is located at the specified position as shown.



2. Removing the S-tension regulator band assembly

Remove the S-tension regulator band assembly that is connected to the S-tension regulator assembly.
(Refer to Section 7-8.)

3. Removing the end sensor assembly

Remove the precision screw and the end sensor assembly.
(Refer to Section 7-15.)

4. Removing S-tension regulator assembly

Remove the two precision screws and S-tension regulator assembly in the direction of the arrow.

Note

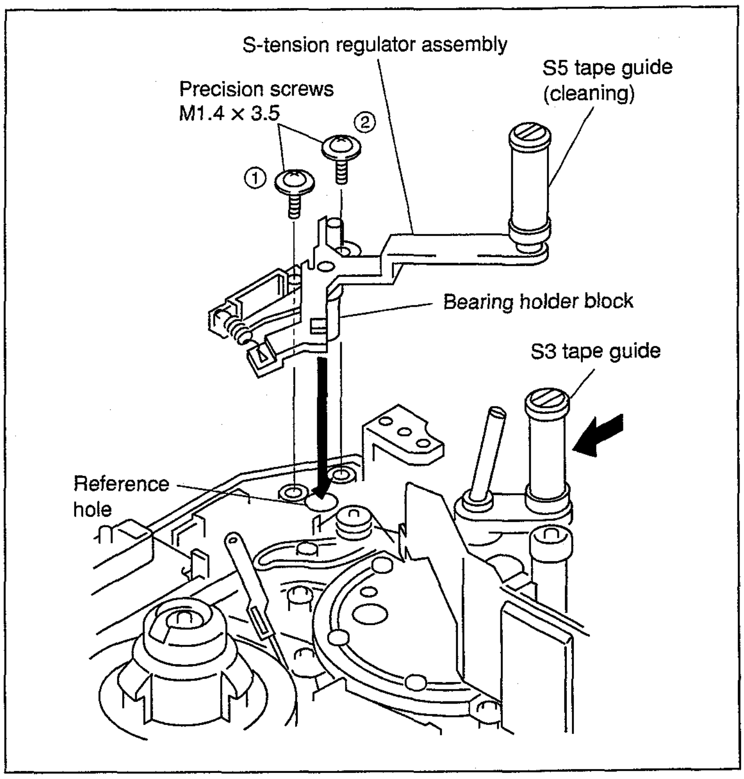
Apply grease to the leaf spring of the S-tension regulator assembly as required.
(Refer to Section 2-2-4.)

Installation

5. Installing S-tension regulator assembly

Insert the bearing holder block of the new S-tension regulator assembly into the reference hole and fix it with the two precision screws in the order starting from ① then ②.

The standard tightening torque value :
10×10^{-2} N• m (1.0 kgf•cm)



6. Installing the S-tension regulator band assembly

Install the S-tension regulator band assembly.
(Refer to Section 7-8.)

7. Installing the end sensor assembly

Fix the end sensor assembly with screw.
(Refer to Section 7-15.)

8. Cleaning of tape guide of S-tension regulator arm (S5)

Clean the S-tension regulator arm (S5) tape guide using a cleaning cloth moistened with cleaning fluid. After cleaning, be sure to wipe the cleaning fluid off the cleaned portions using a dry cleaning cloth.

9. Moving the S3 tape guide

Rotate the manual eject gear (A) clockwise until the S3 tape guide returns to the original position.

Adjustments after Replacement

10. S-tension regulator operating position adjustment

(Refer to Section 8-1-2.)

11. FWD back tension adjustment

(Refer to Section 8-1-3.)

12. Tape run adjustment

(Refer to Section 8-2-1.)

13. Capstan add-on recording adjustment

(Refer to Section 10-4-3.)

7-22. T-Tension Regulator Assembly Replacement

Overview

Replacement

Removing the T-tension regulator band assembly
Removing the T-tension regulator assembly
Installing the T-tension regulator assembly
Installing the T-tension regulator band assembly
Cleaning of tape guide of T-tension regulator arm (T5)

Adjustments after replacement

FWD back tension adjustment
Tape run adjustment
Capstan add-on recording adjustment

Preparations

1. Turn the POWER switch to OFF.
2. Remove the front lid and outside panel assembly. (Refer to Section 1-4.)
3. Remove the cassette compartment. (Refer to Section 1-9.)
4. Check that the unit is in the unthreading-end state.

Note

The stop washer is used to fix the T-tension regulator assembly.
Prepare two new stop washers (3-559-408-11) when replacing it.

Tools

- Stop washer fastening tool : J-6323-530-A
- Torque cassette (FWD back tension) : J-6323-890 -A
- Cleaning cloth : 3-184-527-01
- Cleaning fluid : 9-919-573-01
- Oil : 7-661-018-18

Removal

1. Removing the T-tension regulator band assembly

(1) Remove the extension spring from the T-tension regulator arm.

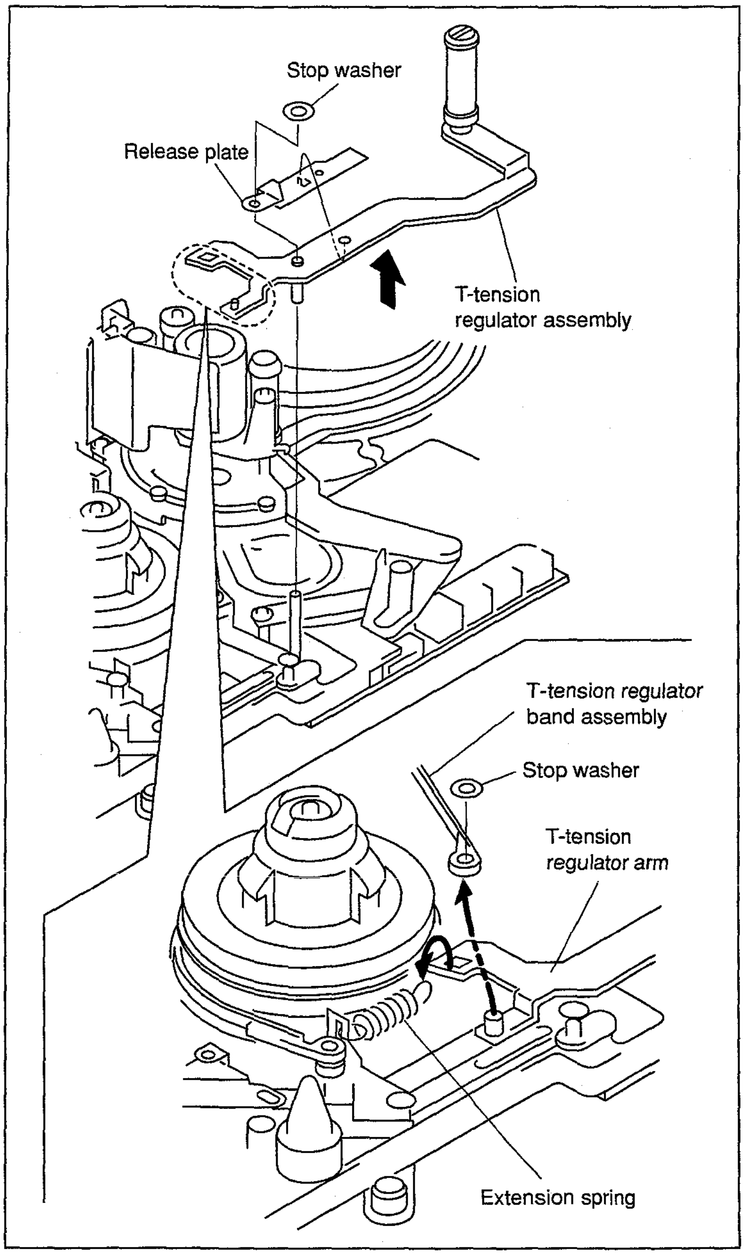
(2) Remove the stop washer and remove the T-tension regulator band assembly passing underneath the T-tension regulator arm.

2. Removing the T-tension regulator assembly

(1) Remove the stop washer and remove the T-tension regulator assembly.

Notes

- The release plate comes off at the same time. Be careful not to lose it.
- Depending on the time of production at the factory, there are sets that have no release plate.


Stop washer
Release plate
T-tension regulator assembly
T-tension regulator band assembly
Stop washer
T-tension regulator arm
Extension spring

Installation

3. Installing the T-tension regulator assembly

(1) Clean the mount shaft.

(2) Install the release plate in the new T-tension regulator assembly as follows.

  1. Insert the protruded portion of the release plate into the hole of the T-tension regulator assembly. Then rotate it in the direction of A.
  2. Align the hole of the release plate with the top of the shaft. (Fig.1)

Note

Depending on the time of production at the factory, there are sets that have no release plate.

(3) Install the new T-tension regulator assembly to the mount shaft with the new stop washer.

(4) Install the extension spring that is removed in step 1 (1) of "Removal".

4. Installing the T-tension regulator band assembly

Engage the hook of the T-tension regulator band assembly on the T-tension regulator arm shaft passing underneath the T-tension regulator arm.

Notes

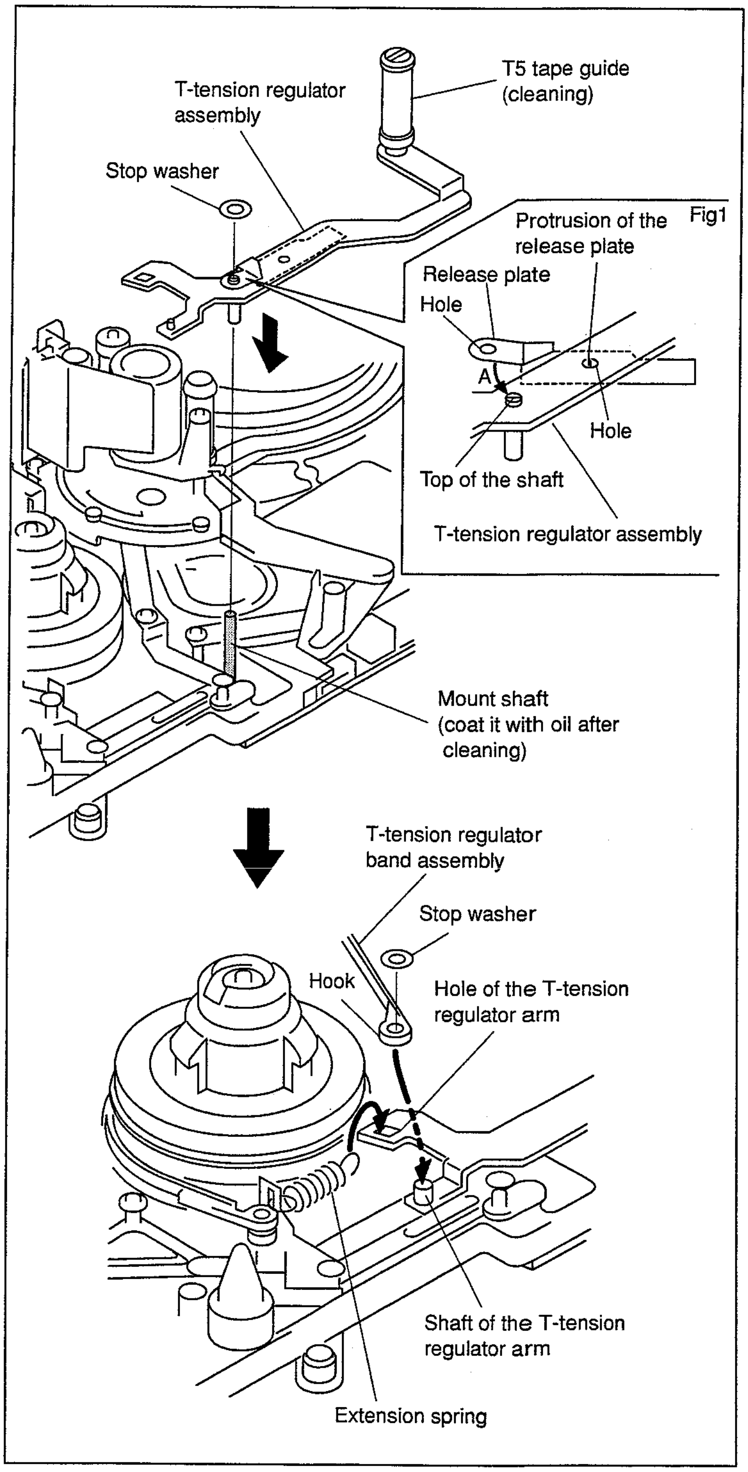
- When installing the stop washer, do not apply excessive force to the T-tension regulator arm.
- When installing it, be careful not to bend the T-tension regulator band assembly that results in damage.
- Do not touch the felt surface of the T-tension regulator band assembly with hands. Also never attach oil on the felt surface.

5. Cleaning of tape guide of T-tension regulator arm (T5)

Clean the T-tension regulator arm (T5) and tape guide using a cleaning cloth moistened with cleaning fluid.

Note

After cleaning, be sure to wipe the cleaning fluid off the cleaned portions using a dry cleaning cloth.


T-tension regulator assembly
T5 tape guide (cleaning)
Stop washer
Protrusion of the release plate
Fig1
Release plate
Hole
A
Hole
Top of the shaft
T-tension regulator assembly
Mount shaft (coat it with oil after cleaning)
T-tension regulator band assembly
Stop washer
Hook
Hole of the T-tension regulator arm
Shaft of the T-tension regulator arm
Extension spring

Adjustments after Replacement

6. FWD back tension adjustment

(Refer to Section 8-1-3.)

7. Tape run adjustment

(Refer to Section 8-2-1.)

8. Capstan add-on recording adjustment

(Refer to Section 10-4-3.)

7-23. Cassette Stopper Replacement

Overview

Replacement

Removing the full top sensor assembly
Removing the cassette stopper
Installing the cassette stopper
Installing the full top sensor assembly

Note

Be careful not to touch the drum, tape guides and stationary heads all through the replacement work.

Preparations

1. Check that the unit is in the unthreading-end state.
2. Turn the POWER switch to OFF.
3. Remove the front lid and outside panel assembly. (Refer to Section 1-4.)

Note

The cassette stopper can be replaced when the cassette compartment attaches to the unit.

Tools

• Torque screwdriver bit (for M1.4) :	J-6325-110-A
• Torque screwdriver (for 3 kg) :	J-6325-400-A

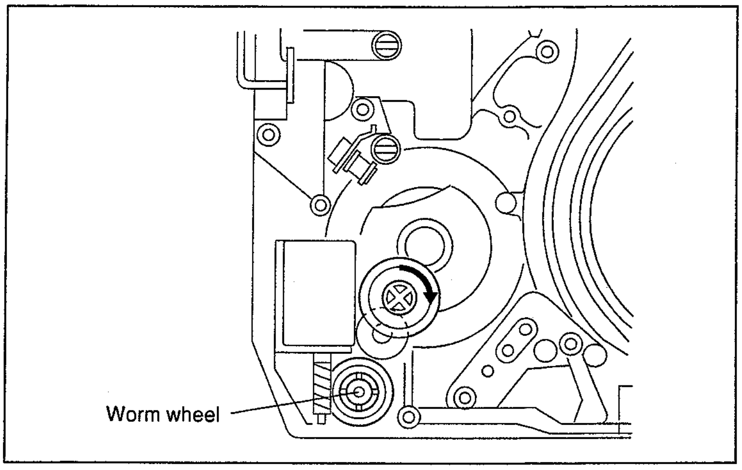
Removal

1. Removing the full top sensor assembly

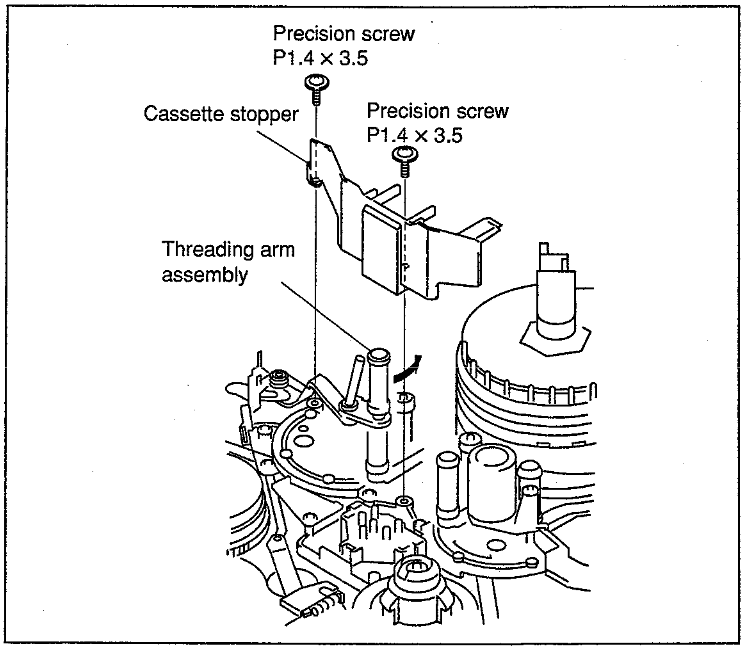
(Refer to Section 7-16.)

2. Removing the cassette stopper

(1) Rotate the worm wheel with a phillips screwdriver clockwise until the screw under the threading arm assembly becomes visible.



(2) Remove the two precision screws and remove the cassette stopper.


Precision screw
P1.4 x 3.5
Cassette stopper
Precision screw
P1.4 x 3.5
Threading arm assembly

Installation

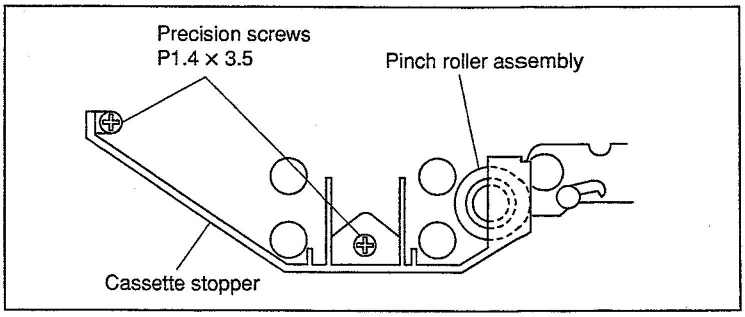
3. Installing the cassette stopper

Install the cassette stopper with two precision screws.

The standard tightening torque value :
10×10^{-2} N•m (1 kgf•cm)

4. Installing the full top sensor assembly

(Refer to Section 7-16.)


Precision screws
P1.4 x 3.5
Pinch roller assembly
Cassette stopper

7-24. Gear Block Assembly Replacement

Overview

Replacement

Checking phase
Removing the cleaning assembly
Removing the gear block assembly
Installing the gear block assembly
Operation check
Installing the cleaning assembly

Preparations

1. Turn the POWER switch to OFF.
2. Remove the front lid and outside panel assembly. (Refer to Section 1-4.)
3. Remove the cassette compartment. (Refer to Section 1-9.)
4. Check that the unit is in the unthreading-end state.

Tools

- Torque screwdriver bit (for M1.4) : J-6325-110-A
- Torque screwdriver (for 3 kg) : J-6325-400-A
- Grease (GL-601) : 7-651-000-10
- Grease (GL-801) : 7-651-000-11

Removal

1. Checking phase

(1) Check that the claw of the gear mount plate of the gear block (B) is aligned with the triangle mark of the cam gear assembly. (Fig. 1)

(2) Check that the entire horizontal bar mark of gear (C) is visible from the gear mount plate (B) of the gear block assembly. (Fig. 2)

Fig 1

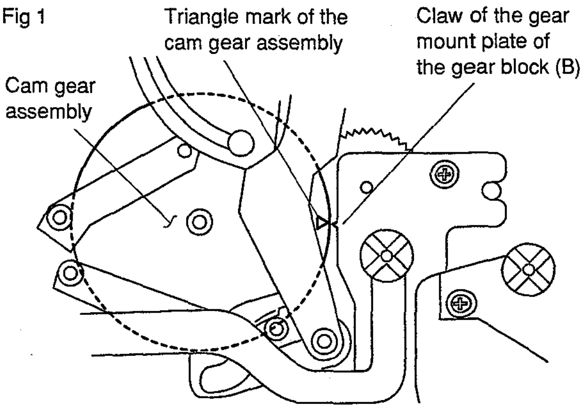
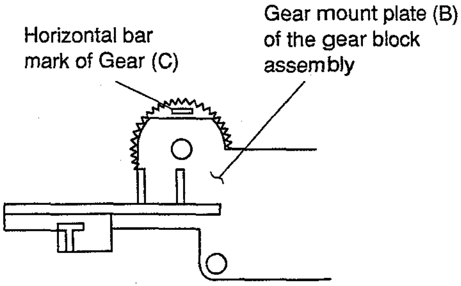

Triangle mark of the cam gear assembly
Claw of the gear mount plate of the gear block (B)
Cam gear assembly

Fig 2

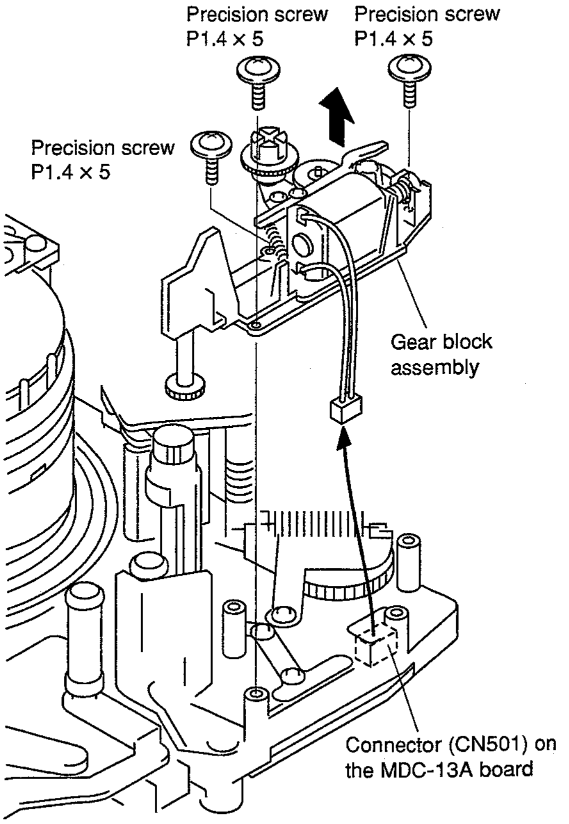

Horizontal bar mark of Gear (C)
Gear mount plate (B) of the gear block assembly

2. Removing the cleaning assembly

Remove the precision screw and cleaning assembly.
(Refer to Section 7-6.)

3. Removing the gear block assembly

Remove the three precision screws. While removing the gear block assembly, disconnect the harness from the connector (CN501) on the MDC-13A board.


Precision screw
P1.4 x 5
Precision screw
P1.4 x 5
Precision screw
P1.4 x 5
Gear block assembly
Connector (CN501) on the MDC-13A board

Installation

4. Installing the gear block assembly

(1) Check that the claw of the gear mount plate of the gear block (B) is aligned with the triangle mark of the cam gear assembly. (Fig. 1)

(2) Check that the hole of the press cam gear is aligned with the hole of the mechanical deck assembly. (Fig. 2)

(3) Check that the round mark of the gear (cleaning) is facing toward the manual eject gear (A)'s mount shaft. (Fig. 3)

(4) Check that the entire horizontal bar mark on gear (C) is visible from the gear mount plate (B) of the new gear block assembly. (Fig. 4)

(5) Connect the connector of the gear block assembly to the connector (CN501) on the MDC-13A board and fix the three precision screws.
The standard tightening torque value :
10×10^{-2} N•m (1 kgf•cm)

5. Operation check

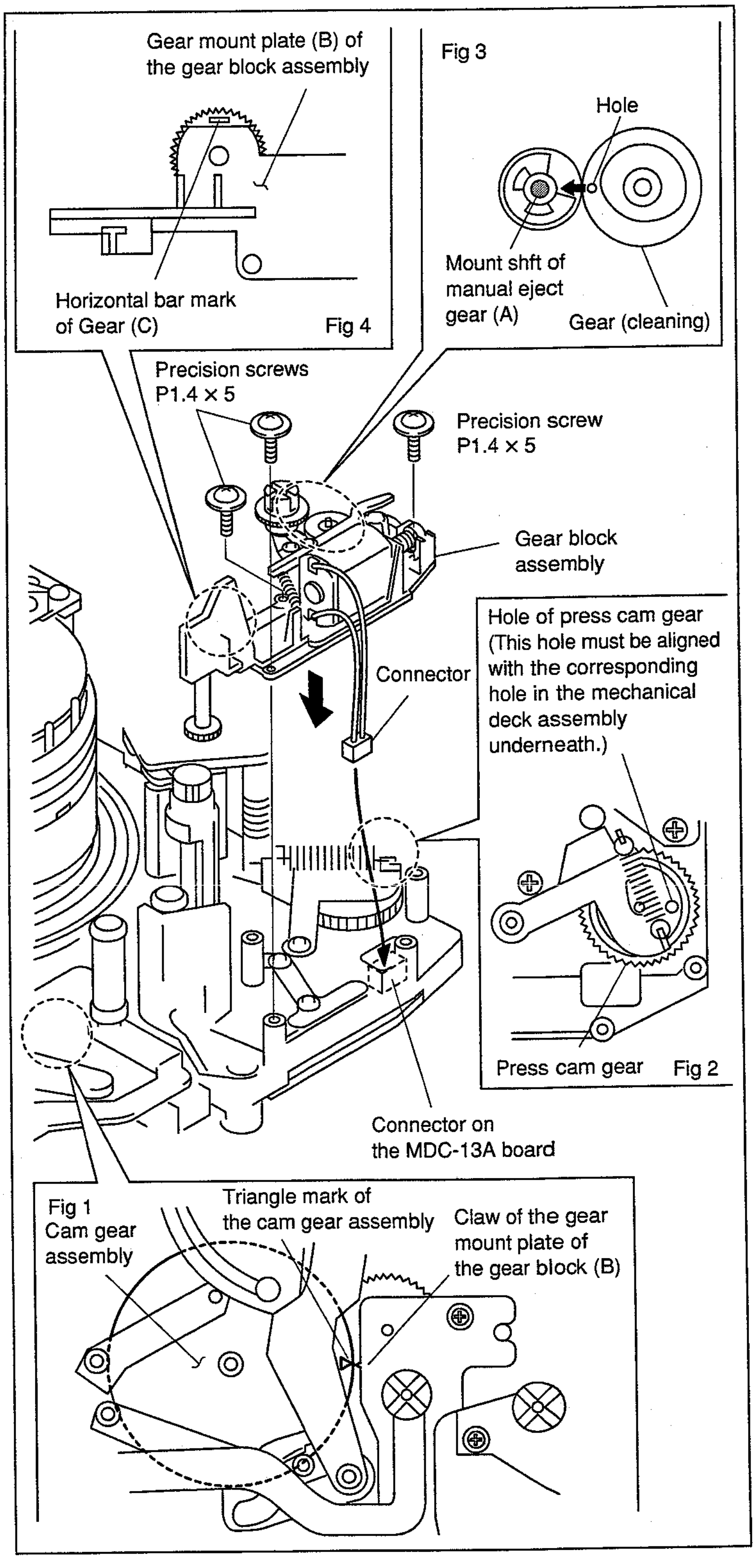
Rotate the manual eject gear (A) (red gear) and check that the threading and the unthreading operations are performed smoothly.

Note

Do not rotate the manual eject gear (A) more than necessary. If rotated excessively, it results in damage of the unit.

6. Installing the cleaning assembly

Install the cleaning assembly with the precision screw.
(Refer to Section 7-6.)


Gear mount plate (B) of the gear block assembly
Horizontal bar mark of Gear (C)
Fig 4
Fig 3
Hole
Mount shft of manual eject gear (A)
Gear (cleaning)
Precision screws P1.4 × 5
Precision screw P1.4 × 5
Gear block assembly
Hole of press cam gear (This hole must be aligned with the corresponding hole in the mechanical deck assembly underneath.)
Connector
Press cam gear
Fig 2
Connector on the MDC-13A board
Fig 1
Cam gear assembly
Triangle mark of the cam gear assembly
Claw of the gear mount plate of the gear block (B)

7-25. S Reel Table Replacement and T Reel Table Replacement

Overview

Replacement

Removing the S-tension regulator band assembly (Only when S reel table assembly is replaced)
Removing the T-tension regulator band assembly (Only when T reel table assembly is replaced)
Removing the reel table
Cleaning the reel shaft
Cleaning the reel table
Installing the reel table (1)
Reel table height adjustment
Installing the reel table (2)
Installing the S-tension regulator band assembly (Only when S reel table assembly is replaced)
Installing the T-tension regulator band assembly (Only when T reel table assembly is replaced)
Operation check

Adjustments after replacement

FWD back tension adjustment (Only when S reel table assembly is replaced)
REV back tension adjustment (Only when T reel table assembly is replaced)
Tape run adjustment
S-tension regulator operating position adjustment (Only when S reel table assembly is replaced)
T tension regulator operating position adjustment (Only when T reel table assembly is replaced)
Capstan add-on recording adjustment

Note

Height of reel tables becomes the reference of the entire tape running system. When reel table is replaced, be sure to perform the reel table height adjustment.

Preparations

1. Turn the POWER switch to OFF.
2. Remove the front lid and outside panel assembly. (Refer to Section 1-4.)
3. Remove the cassette compartment. (Refer to Section 1-9.)
4. Check that the unit is in the unthreading-end state.

Notes

- The stop washer is used to fix the S and T reel tables respectively.
  Prepare a new stop washer (3-559-408-11) when replacing them.
- The three poly-washers are used under and above the S and T reel tables. The poly-washer (t 0.13 : 3-303-961-01) that is attached above a reel table is reserved as the spare poly-washer in case of need after reel table is replaced. Be careful not to lose or damage the poly-washers.

Tools

• Stop washer fastening tool :	J-6323-530-A
• Torque cassette (FWD back tension) :	J-6323-890-A
• Reel table height gauge :	J-6324-150-A
• Cassette reference plate :	J-7032-610-C
• Cleaning cloth :	3-184-527-01
• Cleaning fluid :	9-919-573-01

Removal

1. Removing the S-tension regulator band assembly (Only when S reel table assembly is replaced)

(Refer to Section 7-8.)

2. Removing the T-tension regulator band assembly (Only when T reel table assembly is replaced)

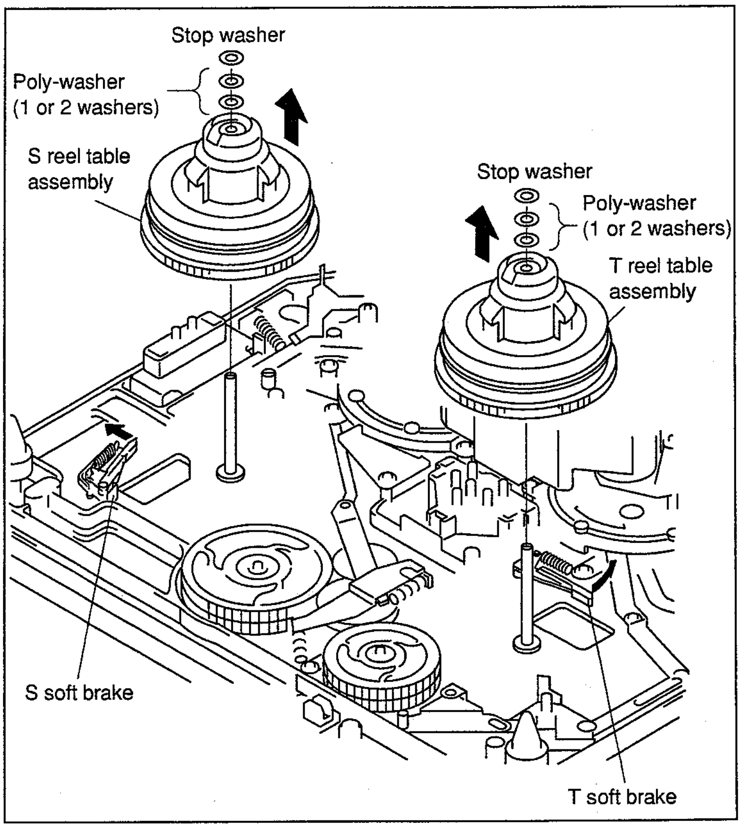
(Refer to Section 7-9.)

3. Removing the reel table

(1) Remove the stop washer fixing the reel table with a pair of tweezers.
(2) Remove the poly-washer(s) (1 or 2 washers).
(3) While pressing the soft brakes out of their positions with finger, remove the reel table.

Note

There are cases that the poly-washer that is placed underneath the reel table comes with the reel table when it is removed. In such case, be sure to return all of the poly-washer to the reel table.


Stop washer
Poly-washer
(1 or 2 washers)
S reel table assembly
Stop washer
Poly-washer
(1 or 2 washers)
T reel table assembly
S soft brake
T soft brake

Installation

4. Cleaning the reel shaft

Clean the reel shaft using a cleaning cloth moistened with cleaning fluid.

5. Cleaning the reel table

(1) Clean the surface of a reel table, that contacts the tension regulator band assembly using a cleaning cloth moistened with cleaning fluid.

(2) Wipe the bottom surface of the reel table with dry cloth.

6. Installing the reel table (1)

While pressing the soft brake arm out of their position with finger, install the reel table to the reel shaft.

7. Reel table height adjustment

(Refer to Section 8-1-1.)

8. Installing the reel table (2)

(1) Install the poly-washers that are not used in step 7 (becoming extra poly-washers), to the reel shaft.

(2) Fix the reel table with the new stop washer.

(3) Move the reel table up and down to confirm that there is a play. If there is no play, remove a single piece of poly-washer from the top of the reel table.

9. Installing the S-tension regulator band assembly (Only when S reel table assembly is replaced)

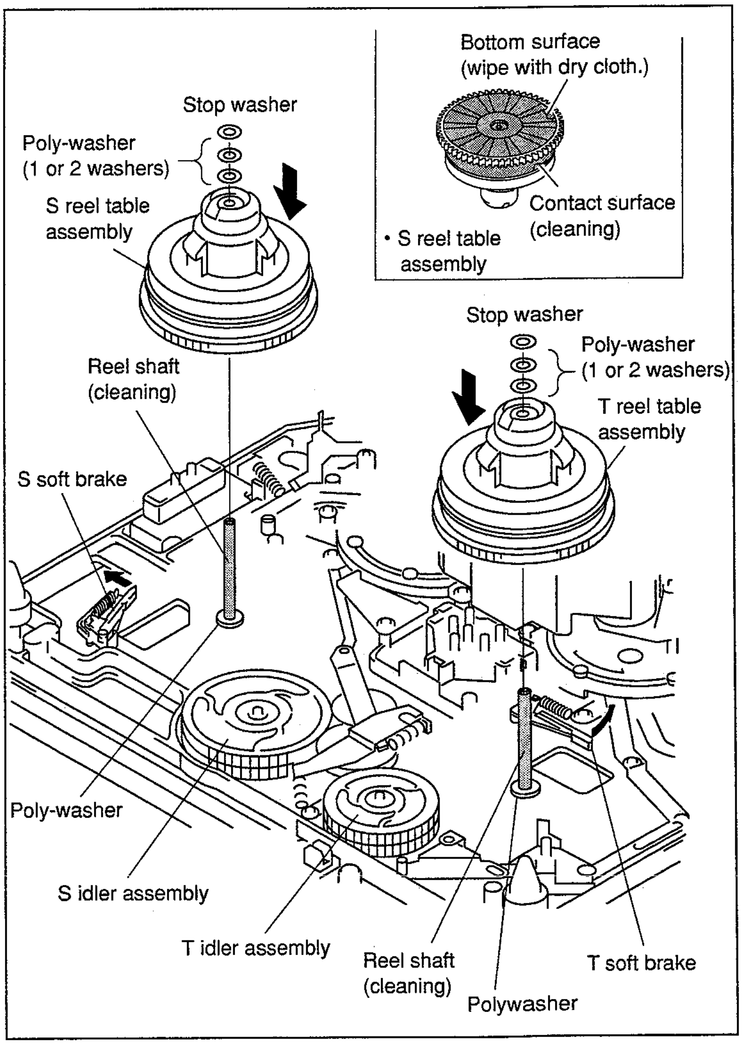
(Refer to Section 7-8.)

10. Installing the T-tension regulator band assembly (Only when T reel table assembly is replaced)

(Refer to Section 7-9.)

11. Operation check

While pressing the soft brake out of their position with finger, rotate the reel to confirm that the reel table and the S/T idler assemblies rotate smoothly.


Bottom surface
(wipe with dry cloth.)
Contact surface
(cleaning)
• S reel table
assembly
Stop washer
Poly-washer
(1 or 2 washers)
S reel table
assembly
Reel shaft
(cleaning)
S soft brake
Stop washer
Poly-washer
(1 or 2 washers)
T reel table
assembly
Poly-washer
S idler assembly
T idler assembly
Reel shaft
(cleaning)
Polywasher
T soft brake

Adjustments after replacement

12. FWD back tension adjustment (Only when S reel table assembly is replaced.)

(Refer to Section 8-1-3.)

13. REV back tension adjustment (Only when T reel table assembly is replaced)

(Refer to Section 8-1-4.)

14. Tape run adjustment

(Refer to Section 8-2-1.)

15. S tension regulator operating position adjustment (Only when S reel table assembly is replaced)

(Refer to Section 8-1-2.)

16. T tension regulator operating position adjustment (Only when T reel table assembly is replaced)

(Refer to sect 8-1-6.)

17. Capstan add-on recording adjustment

(Refer to Section 10-4-3.)

7-26. Reel Drive Gear Assembly Replacement

Overview

Replacement

Removing the timing belt
Removing the reel drive gear assembly
Installing the reel drive gear assembly
Installing the timing belt

Adjustments after replacement

Timing belt tension adjustment
Capstan add-on recording adjustment

Preparations

1. Turn the POWER switch to OFF.
2. Remove the front lid and outside panel assembly. (Refer to Section 1-4.)
3. Open the inside panel assembly. (Refer to Section 1-5.)
4. Removing the plug-in boards (Refer to Section 1-7.)
5. Remove the cassette compartment. (Refer to Section 1-9.)
6. Removing the SS-92 board (Refer to Section 6-20.)

Note

Reel drive gear assembly replacement can be performed in the state that mechanical deck assembly is being installed in the unit.

Tools

- Torque screwdriver bit (for M1.4) : J-6325-110-A
- Torque screwdriver bit (for M2) : J-6325-380-A
- Torque screwdriver (for 3 kg) : J-6325-400-A

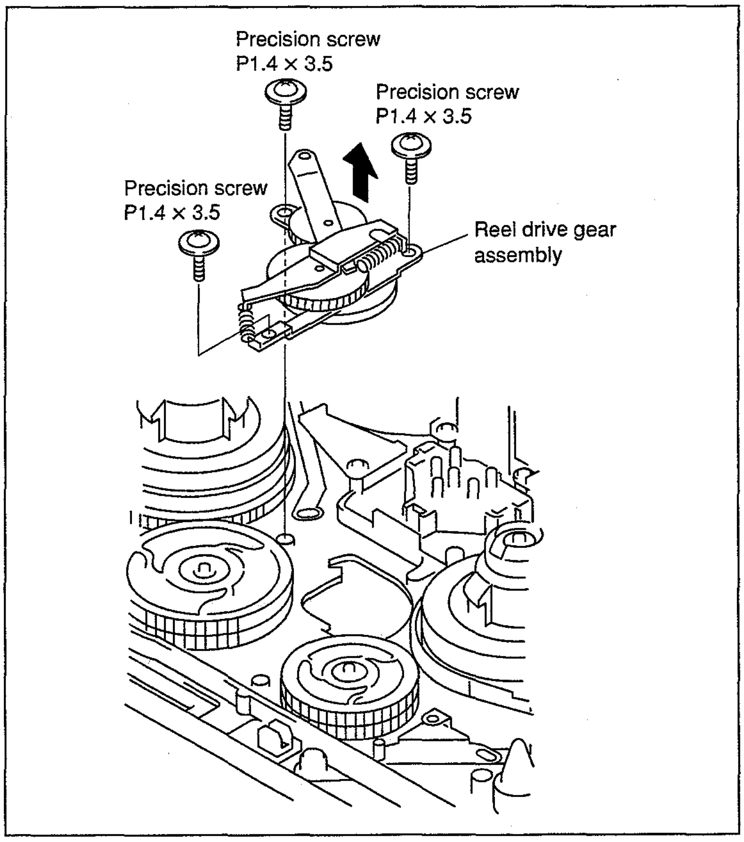
Removal

1. Removing the timing belt

(Refer to Section 7-10.)

2. Removing the reel drive gear assembly

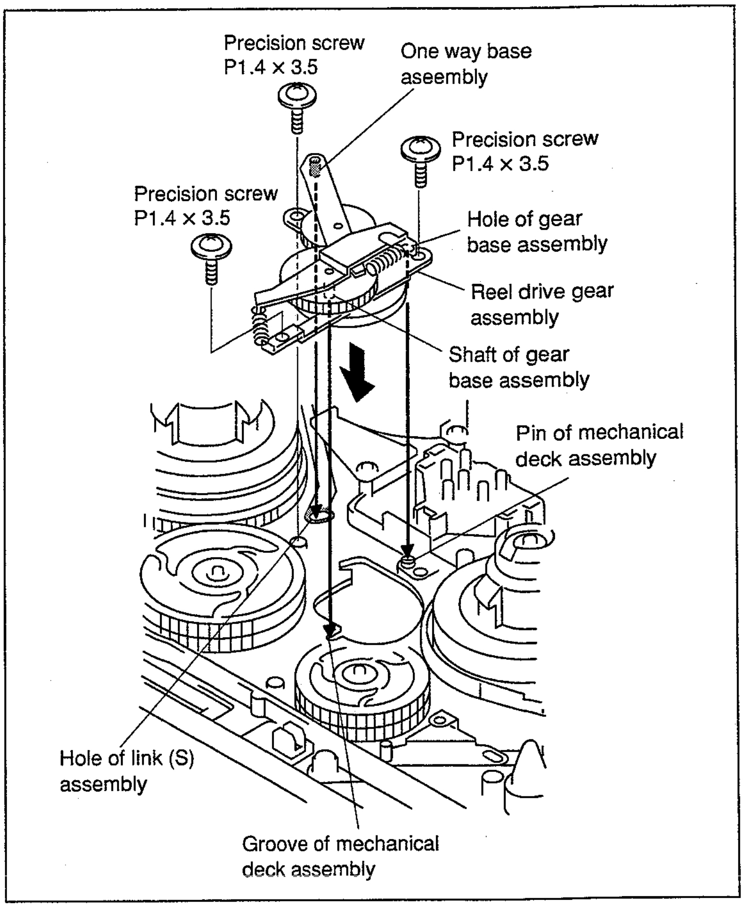
Remove the three precision screws and remove the reel drive gear assembly.


Precision screw
P1.4 × 3.5
Precision screw
P1.4 × 3.5
Precision screw
P1.4 × 3.5
Reel drive gear assembly

Installation

3. Installing the reel drive gear assembly

Install the new reel drive gear assembly with three precision screws.
The standard tightening torque value :
10 × 10^{-2} N•m (1 kgf•cm)


Precision screw
P1.4 × 3.5
One way base asembly
Precision screw
P1.4 × 3.5
Precision screw
P1.4 × 3.5
Hole of gear base assembly
Reel drive gear assembly
Shaft of gear base assembly
Pin of mechanical deck assembly
Hole of link (S) assembly
Groove of mechanical deck assembly

Notes

- Check that the shaft of the one way base assembly has entered the slot of the link (S) assembly.
- Check that the shaft of the gear base assembly has entered the groove of the mechanical deck assembly. Check also that the pin of the mechanical deck assembly has entered the hole of the gear base assembly.

4. Installing the timing belt

(Refer to Section 7-10.)

Adjustments after Replacement

5. Timing belt tension adjustment

(Refer to Section 8-1-5.)

6. Capstan add-on recording adjustment

(Refer to Section 10-4-3.)

7-27. Holder Assembly Sensor (ID) Replacement

Overview

Replacement

Removing the full top sensor assembly
Removing the cassette stopper
Removing the holder assembly sensor (ID)
Installing the holder assembly sensor (ID)
Operation check
Installing the cassette stopper
Installing the full top sensor assembly

Preparations

1. Turn the POWER switch to OFF.
2. Remove the front lid and outside panel assembly. (Refer to Section 1-4.)

Note

Holder assembly sensor (ID) can be replaced when the cassette compartment attaches to the unit.

Removal

1. Removing the full top sensor assembly

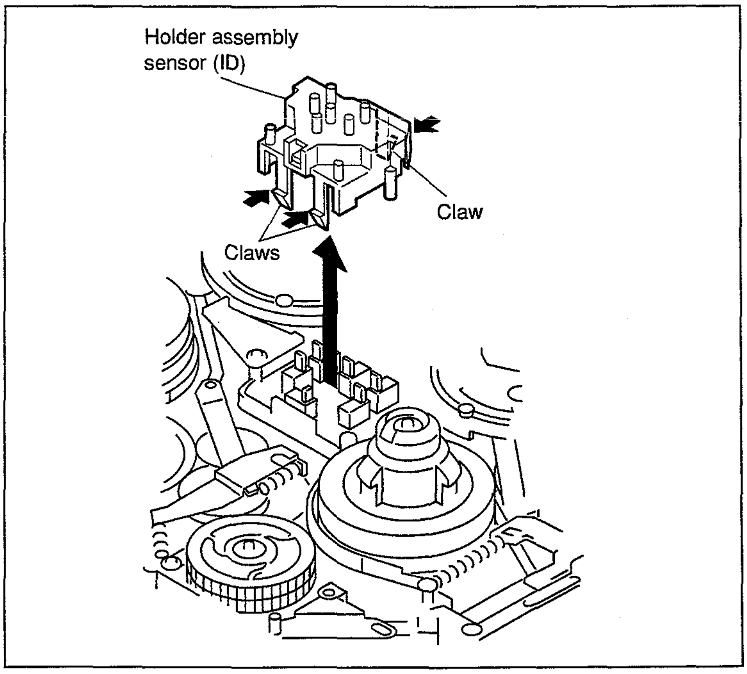
(Refer to Section 7-16.)

2. Removing the cassette stopper

(Refer to Section 7-23.)

3. Removing the holder assembly sensor (ID)

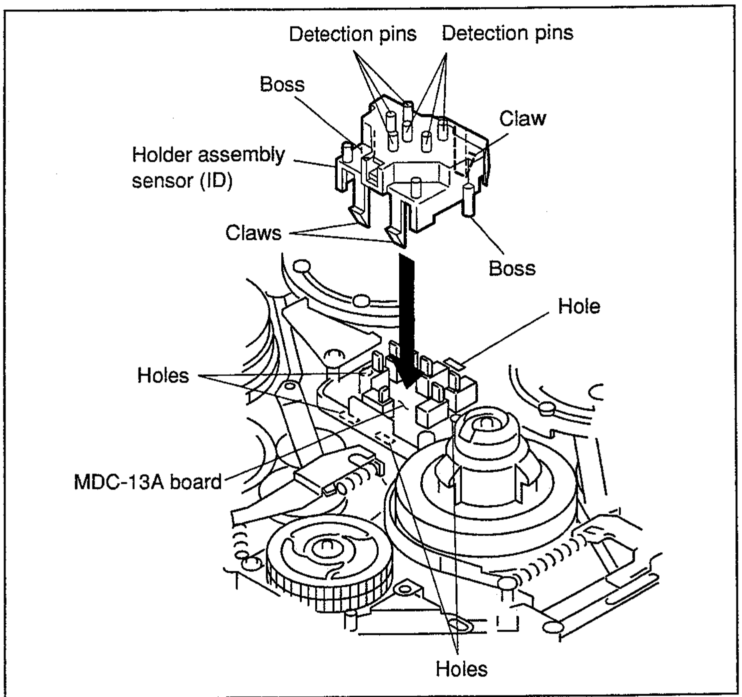
While pressing the claws at the three locations with a pair of tweezers, remove the holder assembly sensor (ID) by pulling it up.



Installation

4. Installing the holder assembly sensor (ID)

Install the new holder assembly sensor (ID) by inserting the bosses and claws into the five holes on the MDC-13A board.


Detection pins
Detection pins
Boss
Claw
Holder assembly sensor (ID)
Claws
Boss
Hole
Holes
MDC-13A board
Holes

5. Operation check

Check that the detection pin moves up and down smoothly and also returns to the original position.

6. Installing the cassette stopper

(Refer to Section 7-23.)

7. Installing the full top sensor assembly

(Refer to Section 7-16.)

7-28. Top Sensor Assembly Replacement

Overview

Replacement

Removing the cleaning assembly
Removing the gear block assembly
Removing the top sensor assembly
Installing the top sensor assembly
Installing the gear block assembly
Installing the cleaning assembly

Preparations

1. Turn the POWER switch to OFF.
2. Remove the front lid and outside panel assembly. (Refer to Section 1-4.)
3. Remove the cassette compartment. (Refer to Section 1-9.)
4. Check that the unit is in the unthreading-end state.

Tools

• Torque screwdriver bit (for M1.4) :	J-6325-110-A
• Torque screwdriver (for 3 kg) :	J-6325-400-A

Removal

1. Removing the cleaning assembly

(Refer to Section 7-6.)

2. Removing the gear block assembly

(Refer to Section 7-24.)

3. Removing the top sensor assembly

Remove the two precision screws. While removing the connector (CN508) on the MDC-13A board, remove the top sensor assembly.

Installation

4. Installing the top sensor assembly

(1) Align the position-setting pin of the new top sensor assembly with the reference hole. At the same time while holding the lower flange of the T4 tape guide as shown, connect the connector of the top sensor to the connector (CN508) on the MDC-13A board.

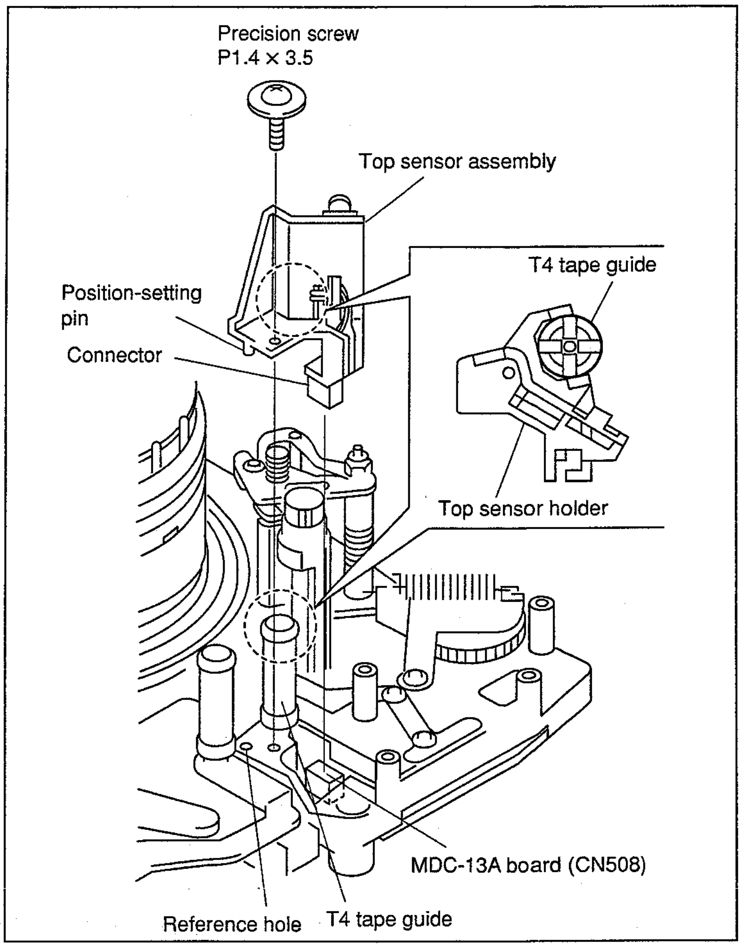
(2) Install the top sensor with precision screw. The standard tightening torque value :
10×10^{-2} N•m (1 kgf•cm)

5. Installing the gear block assembly

(Refer to Section 7-24.)

6. Installing the cleaning assembly

(Refer to Section 7-6.)


Precision screw
P1.4 × 3.5
Top sensor assembly
T4 tape guide
Position-setting pin
Connector
Top sensor holder
MDC-13A board (CN508)
Reference hole
T4 tape guide

7-29. Pinch Arm Assembly Replacement

Overview

Replacement

Removing the T-tension regulator assembly
Removing the pinch arm assembly
Cleaning the mount shaft
Applying oil to the mount shaft
Installing the pinch arm assembly
Installing the T-tension regulator assembly
Cleaning the pinch roller assembly

Adjustments after replacement

Tape run adjustment
Capstan add-on recording adjustment

Preparations

1. Turn the POWER switch to OFF.
2. Remove the front lid and outside panel assembly. (Refer to Section 1-4.)
3. Remove the cassette compartment. (Refer to Section 1-9.)
4. Check that the unit is in the unthreading-end state.

Note

The stop washer is used to fix the pinch arm assembly.
Prepare a new stop washer (3-559-408-11) when replacing it.

Tools

- Stop washer fastening tool : J-6323-530-A
- Cleaning cloth : 3-184-527-01
- Cleaning fluid : 9-919-573-01
- Oil (SGL-601) : 7-651-000-10
- Oil (SGL-801) : 7-651-000-11

Removal

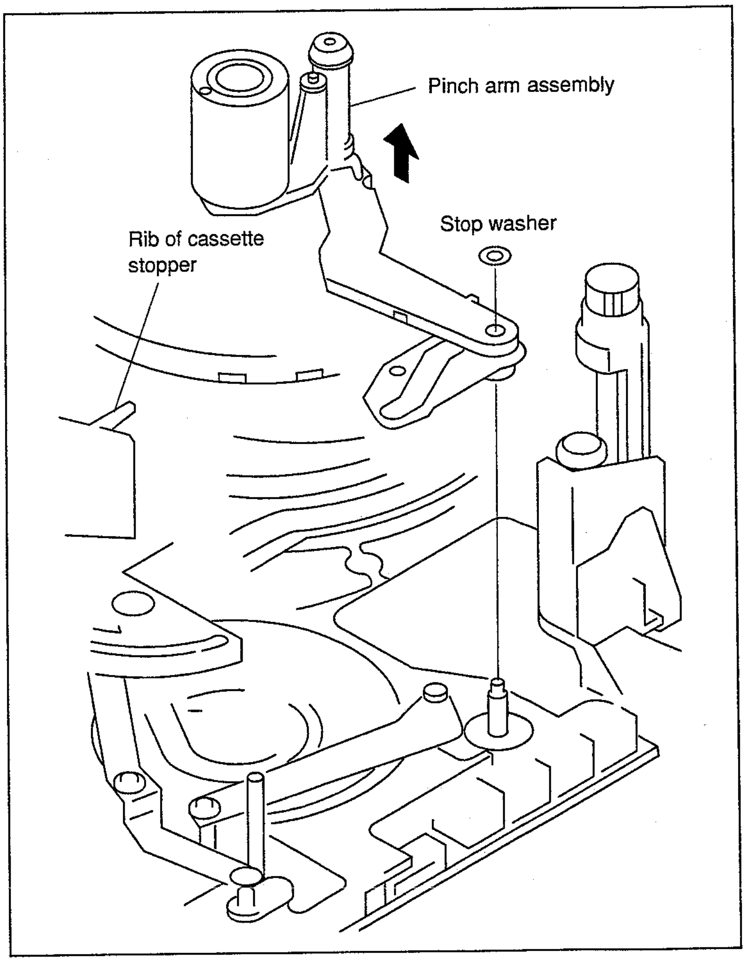
1. Removing the T-tension regulator assembly

Remove the stop washer and remove T-tension regulator assembly.
(Refer to Section 7-22.)

2. Removing the pinch arm assembly

(1) Rotate the manual eject gear (A) using phillips screwdriver counter-clockwise until the pinch roller assembly is completely disengaged from the rib of the cassette stopper.

(2) Remove the stop washer with a pair of tweezers and remove the pinch arm assembly.


Pinch arm assembly
Stop washer
Rib of cassette stopper

Installation

3. Cleaning the mount shaft

Clean the mount shaft and bearing using a cleaning cloth moistened with cleaning fluid.

4. Applying oil to the mount shaft

Apply 1/2 drop of oil to the mount shaft and bearing assembly.

5. Installing the pinch arm assembly

(1) While running the cam groove of the arm assembly through the bearing, install the mount shaft to the pinch arm assembly mount shaft.

(2) Fix the new stop washer.

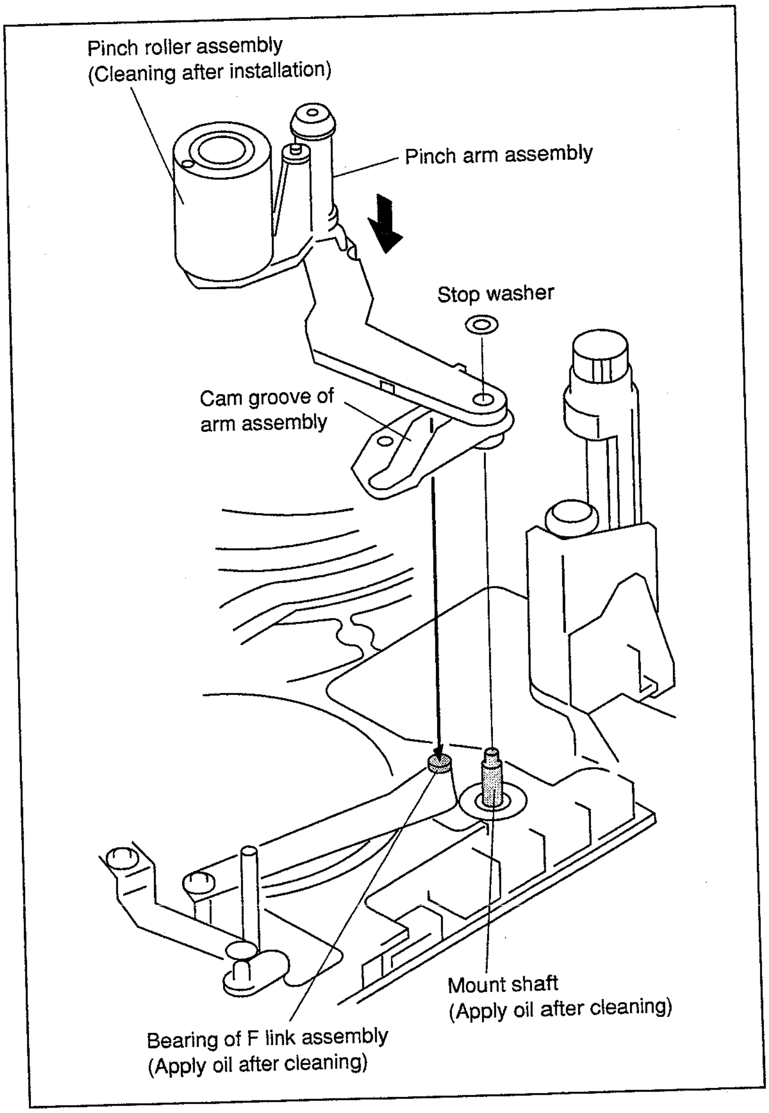
6. Installing the T-tension regulator assembly

Fix the T-tension regulator assembly with the new stop washer. (Refer to Section 7-22.)

7. Cleaning the pinch roller assembly

(1) After installing it, clean the pinch roller assembly surface using a cleaning cloth moistened with cleaning fluid.

(2) Rotate the manual eject gear (A) using phillips screwdriver clockwise until the unthreading-end state is established.


Pinch roller assembly
(Cleaning after installation)
Pinch arm assembly
Stop washer
Cam groove of
arm assembly
Mount shaft
(Apply oil after cleaning)
Bearing of F link assembly
(Apply oil after cleaning)

Adjustments after Replacement

8. Tape run adjustment

(Refer to Section 8-2-1.)

9. Capstan add-on recording adjustment

(Refer to Section 10-4-3.)

7-30. Threading Arm Assembly Replacement

Overview

Replacement

Removing the S-tension regulator band assembly
Removing the S-tension regulator assembly
Removing the threading arm assembly
Cleaning the mount shaft
Applying oil to the mount shaft
Installing the threading arm assembly
Installing the S-tension regulator assembly
Installing the S-tension regulator band assembly
Cleaning the guide of the S-tension regulator (S5)
Cleaning the guide of the threading arm assembly (S4)

Adjustments after replacement

S3 guide height adjustment
S-Tension regulator operating position adjustment
FWD back tension adjustment
Tape run adjustment

Note

Height of S3 guides becomes the reference of the entire tape running system. When threading arm assembly is replaced, be sure to adjust the S3 guide height.

Preparations

1. Turn the POWER switch to OFF.
2. Remove the front lid and outside panel assembly. (Refer to Section 1-4.)
3. Remove the cassette compartment. (Refer to Section 1-9.)
4. Check that the unit is in the unthreading-end state.

Note

The stop washer is used to fix the threading arm assembly.
Prepare a new stop washer (3-559-408-11) when replacing it.

Tools

• Stop washer fastening tool :	J-6323-530-A
• Torque cassette (FWD back tension) :	J-6323-890-A
• S3 guide height check tool :	J-6531-270-A
• Cleaning cloth :	3-184-527-01
• Cleaning fluid :	9-919-573-01
• Torque screwdriver bit (for M1.4) :	J-6325-110-A
• Torque screwdriver (for 3 kg) :	J-6325-400-A
• Oil :	7-661-018-18

Removal

1. Removing the S-tension regulator band assembly

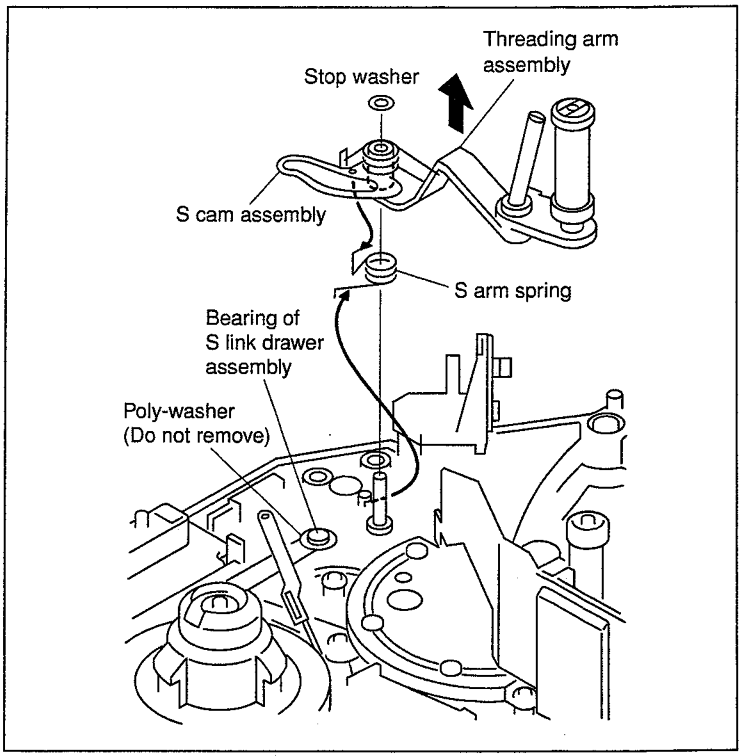
(Refer to Section 7-8.)

2. Removing the S-tension regulator assembly

(Refer to Section 7-21.)

3. Removing the threading arm assembly

Remove the stop washer and remove threading arm assembly.


Threading arm assembly
Stop washer
S cam assembly
S arm spring
Bearing of S link drawer assembly
Poly-washer (Do not remove)

Notes

- Be careful not to lose the S arm spring because it jumps out when the threading arm is removed.
- Do not remove the poly-washer of bearing at the S link drawer assembly.
  Also, be careful not to lose the poly-washer because it may be removed together with the S cam assembly of the threading arm assembly when the S cam assembly is removed.

Installation

4. Cleaning the mount shaft

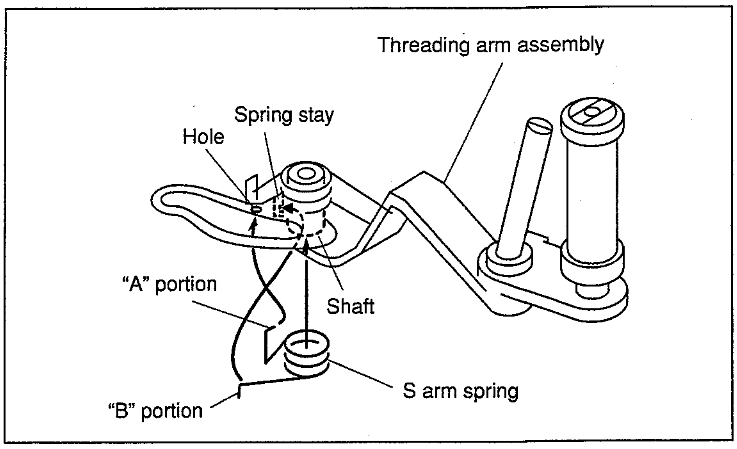
Clean the mount shaft and the bearing using a cleaning cloth moistened with cleaning fluid.

5. Applying oil to the mount shaft

Apply 1/2 drop of oil to the mount shaft and bearing respectively.

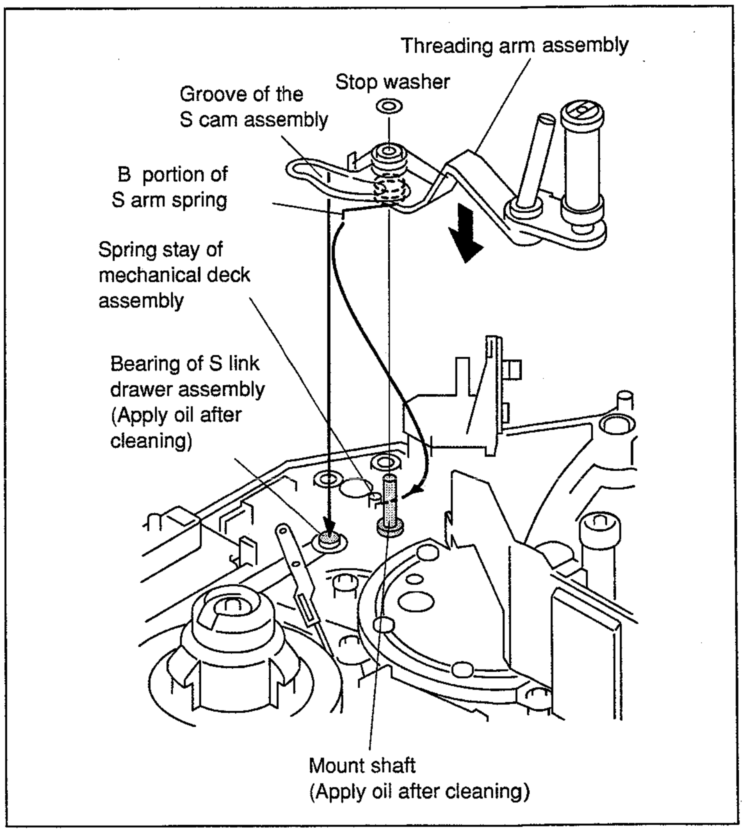
6. Installing the threading arm assembly

(1) Pass the "A" portion of the S arm spring through the hole of the new threading arm assembly and hook it on the shaft. Then hook the "B" portion of the S arm spring on the spring stay.


Threading arm assembly
Spring stay
Hole
"A" portion
Shaft
S arm spring
"B" portion

(2) Pass the groove of the threading arm assembly through the bearing and hook it on the mount shaft. Then remove the "B" portion of the S arm spring from the spring stay and rehook it on the spring stay of the mechanical deck assembly.

(3) Fix the threading arm assembly with the new stop washer.


Threading arm assembly
Groove of the S cam assembly
Stop washer
B portion of S arm spring
Spring stay of mechanical deck assembly
Bearing of S link drawer assembly (Apply oil after cleaning)
Mount shaft (Apply oil after cleaning)

7. Installing the S-tension regulator assembly

(Refer to Section 7-21.)

8. Installing the S-tension regulator band assembly

(Refer to Section 7-8.)

9. Cleaning the guide of the S-tension regulator arm (S5)

(Refer to Section 7-21.)

10. Cleaning the threading arm assembly (S4)

Clean the guides of the threading assembly (S3, S4) using a cleaning cloth moistened with cleaning fluid.

Note

After cleaning, be sure to wipe the cleaning fluid off the cleaned portions using a dry cleaning cloth.

Adjustments after Replacement

11. S3 guide height adjustment

(Refer to Section 8-1-7.)

12. S-Tension regulator operating position adjustment

(Refer to Section 8-1-2.)

13. FWD back tension adjustment

(Refer to Section 8-1-3.)

14. Tape run adjustment

(Refer to Section 8-2-1.)

7-31. TC Head Assembly Replacement

Overview

Replacement

Removing the cleaning assembly
Removing the gear block assembly
Removing the guide plate assembly
Removing the TC head assembly
TC head replacement
Installing the TC head assembly
Installing the guide plate assembly
Installing the gear block assembly
Installing the cleaning assembly
Cleaning the TC head assembly

Adjustments after replacement

Tape run adjustment
Video tracking adjustment
TC head height adjustment
CTL head position adjustment
TC head position adjustment

Preparations

1. Turn the POWER switch to OFF.
2. Remove the front lid and outside panel assembly. (Refer to Section 1-4.)
3. Remove the cassette compartment. (Refer to Section 1-9.)
4. Check that the unit is in the unthreading-end state.

Tools

• Torque screwdriver bit (for M2) :	J-6325-380-A
• Torque screwdriver bit (for M1.4) :	J-6325-110-A
• Torque screwdriver (for 3 kg) :	J-6325-400-A
• Hexagon bit (across 1.5) :	J-6326-120-A
• Cleaning cloth :	3-184-527-01
• Cleaning fluid :	9-919-573-01

Removal

Note

Never loosen nor tighten the screws that are not specified below when replacing the TC head assembly. Doing to gives adverse effect on TC head azimuth and zenith that results in adverse effect on tape running condition and video tracking adjustment.

1. Removing the cleaning assembly

Remove the precision screw and cleaning assembly.
(Refer to Section 7-6.)

2. Removing the gear block assembly

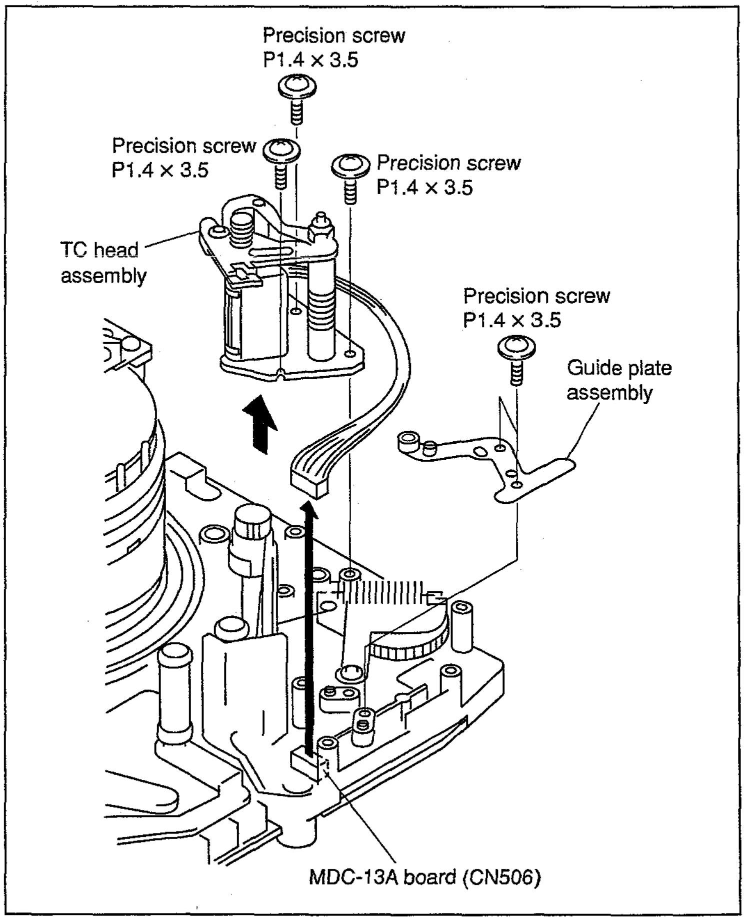
Remove the three precision screws and remove the gear block assembly.
(Refer to Section 7-24.)

3. Removing the guide plate assembly

Remove the two precision screws and remove the guide plate assembly .

4. Removing the TC head assembly

(1) Remove the connector (CN506) on the MDC-13A board.
(2) Remove the three precision screws and remove the TC head assembly.


Precision screw
P1.4 × 3.5
Precision screw
P1.4 × 3.5
Precision screw
P1.4 × 3.5
TC head assembly
Precision screw
P1.4 × 3.5
Guide plate assembly
MDC-13A board (CN506)

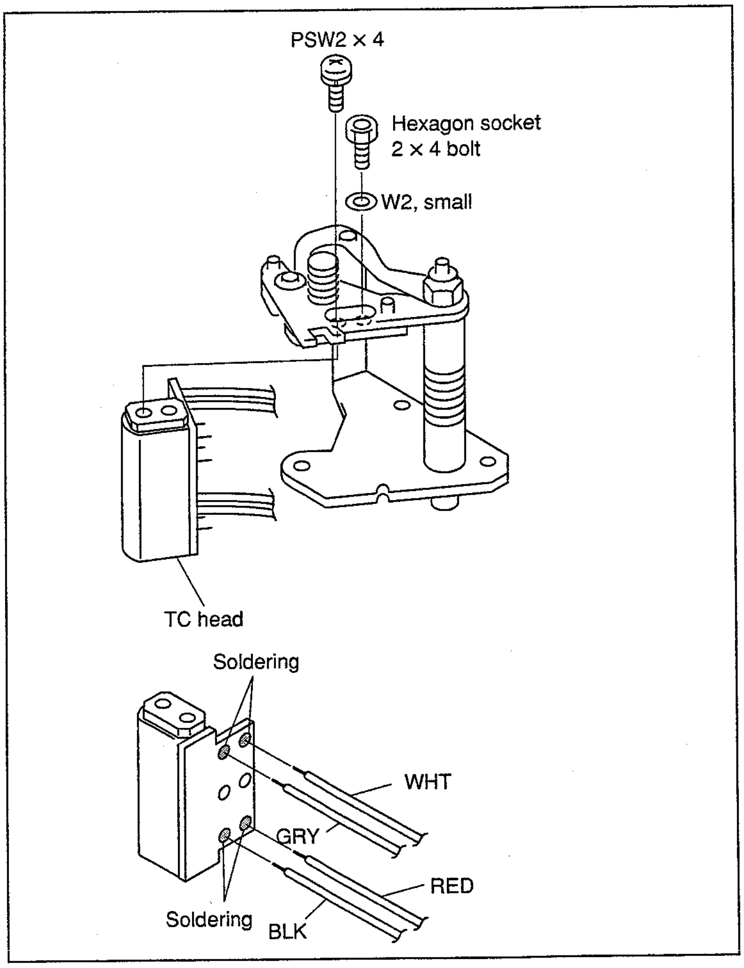
5. TC head replacement

(1) Remove the screw (PSW2 × 4), hexagon socket bolt (2 × 4) and washer (W2, small). Then remove the TC head from shield csase.

(2) Remove soldering of the four wires that are connected to the TC head printed wiring board and connect the wires to the new head by soldering.

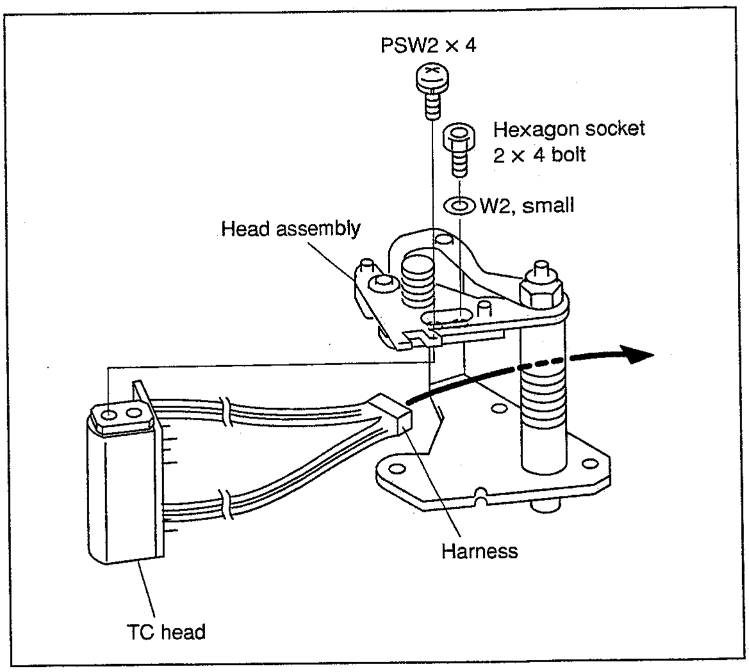
Note

Do not make mistake of soldering positions of the wires.


PSW2 x 4
Hexagon socket 2 x 4 bolt
W2, small
TC head
Soldering
WHT
GRY
RED
Soldering
BLK

(3) Route the TC head harness through the head assembly and fix it with the screw (PSW2 × 4), hexagon head cap bolt (2 × 4) and washer (W2, small).

The standard tightening torque value :
20×10^{-2} N•m (2 kgf•cm) (PSW2 × 4)
30×10^{-2} N•m (3 kgf•cm)
(hexagon socket 2 × 4 bolt)


PSW2 x 4
Hexagon socket 2 x 4 bolt
W2, small
Head assembly
Harness
TC head

Installation

6. Installing the TC head assembly

(1) Insert the position-setting pins of the TC head assembly and the mechanical deck assembly into the reference holes and fix them with the three precision screws.
The standard tightening torque value :
10×10^{-2} N•m (1 kgf•cm)

(2) Connect the connector of the TC head assembly to the connector (CN506) on the MDC-13A board.

(3) While removing extra play of harness in the direction of the arrow, route the harness along with the groove of mechanical deck assembly.

7. Installing the guide plate assembly

Install the guide plate assembly with the two precision screws.

Note

When installing the guide plate assembly, be careful not to pinch the harness between the guide plate assembly and mechanical deck assembly.

8. Installing the gear block assembly

Install the gear block assembly with the three precision screws.
(Refer to Section 7-24.)

9. Installing the cleaning assembly

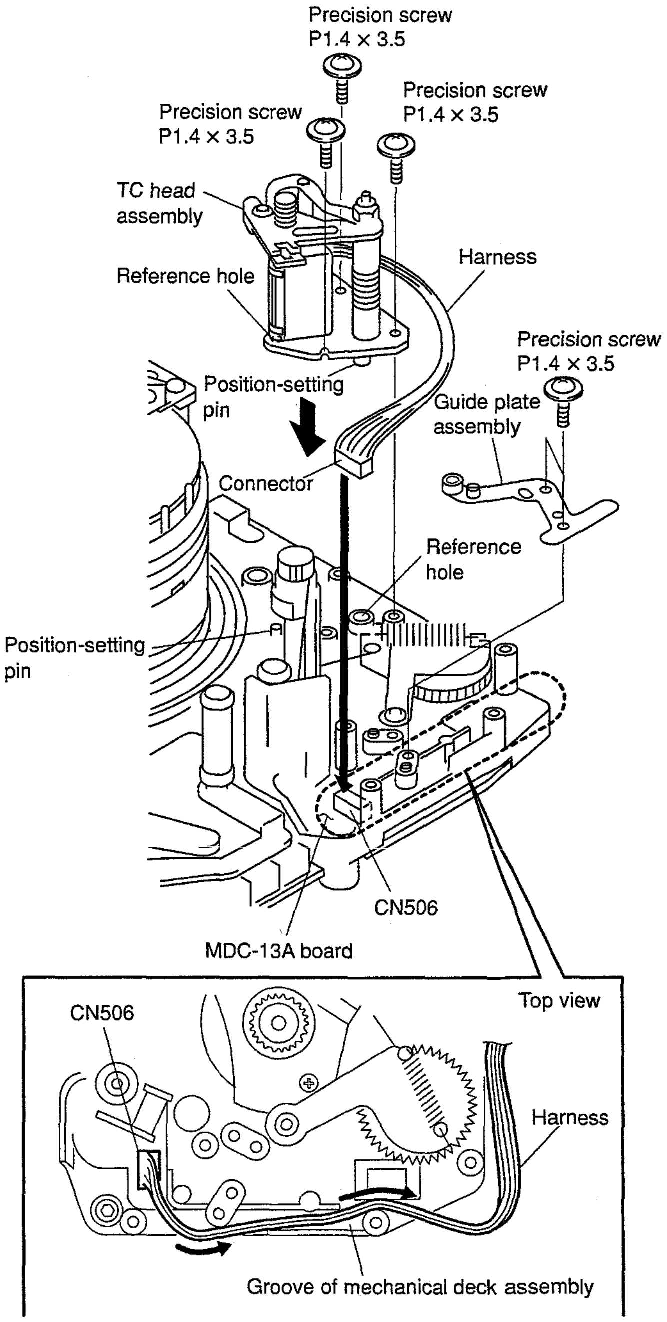
Install the cleaning assembly with the precision screw.
(Refer to Section 7-6.)

10. Cleaning the TC head assembly

Clean the TC head using a cleaning cloth moistened with cleaning fluid.

Note

After cleaning, be sure to wipe the cleaning fluid off the cleaned portions using a dry cleaning cloth.


Precision screw
P1.4 x 3.5
Precision screw
P1.4 x 3.5
Precision screw
P1.4 x 3.5
TC head
assembly
Reference hole
Harness
Precision screw
P1.4 x 3.5
Position-setting
pin
Guide plate
assembly
Connector
Reference
hole
Position-setting
pin
CN506
MDC-13A board
CN506
Top view
Harness
Groove of mechanical deck assembly

Adjustments after Replacement

11. Tape run adjustment

(Refer to Section 8-2-1.)

12. Video tracking adjustment

(Refer to Section 8-2-2.)

13. TC head height adjustment

(Refer to Section 8-2-5.)

14. CTL head position adjustment

(Refer to Section 8-2-4.)

15. TC head position adjustment

(Refer to Section 8-2-6.)

7-32. S Slider Assembly Replacement

Overview

Replacement

Removing the full top sensor assembly
Removing the S-tension regulator band assembly
Removing the S-tension regulator assembly
Removing the threading arm assembly
Removing the cassette stopper
Removing the S rail
Removing the S slider assembly
Installing the S slider assembly
Installing the S rail
Gear chain phase adjustment
Installing the cassette stopper
Installing the threading arm assembly
Installing the S-tension regulator assembly
Installing the S-tension regulator band assembly
Installing the full top sensor assembly
Operation check
Cleaning the heads and tape running surface

Adjustments after replacement

S-Tension regulator arm operating position adjustment
FWD back tension adjustment
Tape run adjustment

Note

Be careful not to touch the drum, tape guides and stationary heads all through the replacement work.

Preparations

1. Turn the POWER switch to OFF.
2. Remove the front lid and outside panel assembly. (Refer to Section 1-4.)
3. Remove the cassette compartment. (Refer to Section 1-9.)
4. Check that the unit is in the unthreading-end state.

Note

The stop washer is used to fix the S slider assembly.
Prepare three new stop washers (3-559-408-11) when replacing it.

Tools

- Torque cassette (FWD back tension) : J-6323-890-A
- Stop washer fastening tool : J-6323-530-A
- Cleaning cloth : 3-184-527-01
- Cleaning fluid : 9-919-573-01
- Torque screwdriver bit (for M1.4) : J-6325-110-A
- Torque screwdriver (for 3 kg) : J-6325-400-A

Removal

1. Removing the full top sensor assembly

Remove the precision screw and full top sensor assembly.
(Refer to Section 7-16.)

2. Removing the S-tension regulator band assembly

Remove the stop washer and remove the S-tension regulator band assembly.
(Refer to Section 7-8.)

3. Removing the S-tension regulator assembly

Remove the two precision screws and S-tension regulator assembly.
(Refer to Section 7-21.)

4. Removing the threading arm assembly

Remove the stop washer and the threading arm assembly.
(Refer to Section 7-30.)

5. Removing the cassette stopper

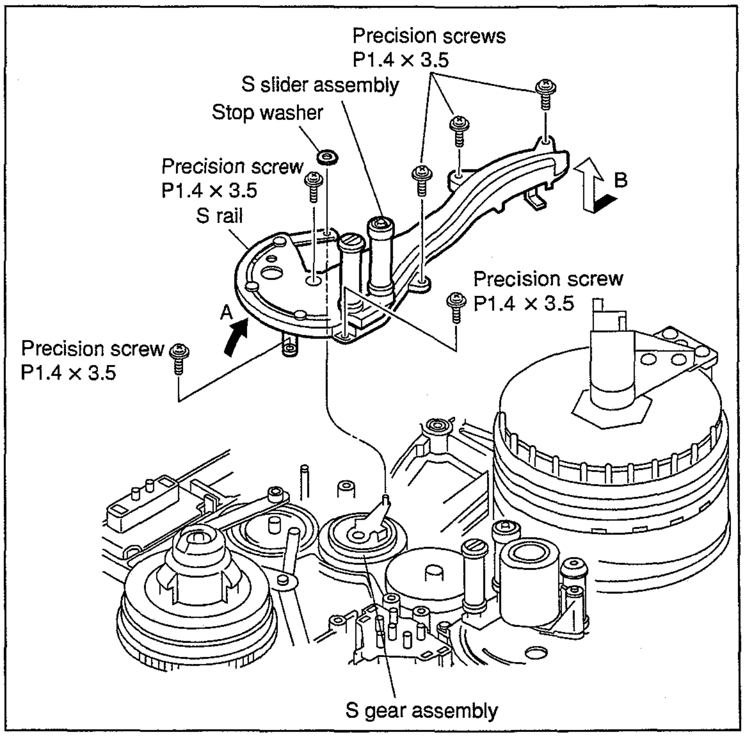
Remove the two precision screws and remove the cassette stopper.
(Refer to Section 7-23.)

6. Removing the S rail

(1) Remove the six precision screws and remove the stop washer.
(2) Raise the front of the S rail in the direction of arrow A first, and then remove the S rail together with the S slider assembly in the direction of arrow B.

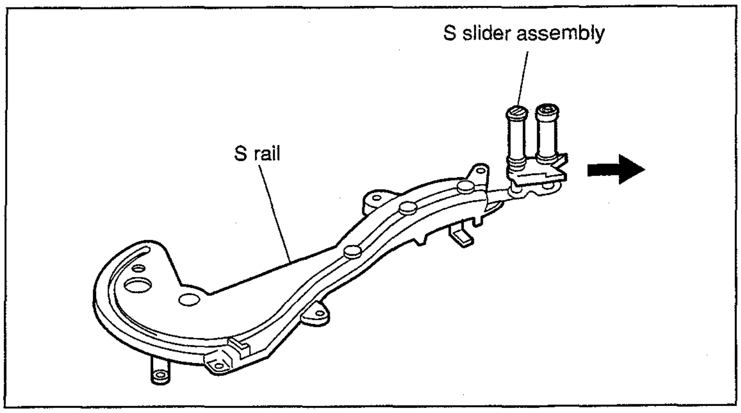
Note

When removing the stop washer, do not apply excessive force to the S gear assembly.


Precision screws
P1.4 × 3.5
S slider assembly
Stop washer
Precision screw
P1.4 × 3.5
S rail
B
A
Precision screw
P1.4 × 3.5
Precision screw
P1.4 × 3.5
S gear assembly

7. Removing the S slider assembly

Slide the S slider back toward rear and remove the S slider assembly from the S rail.


S slider assembly
S rail

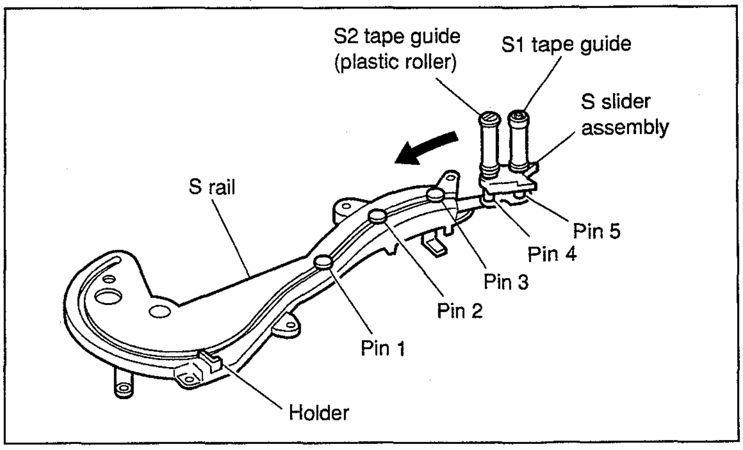
Installation

8. Installing the S slider assembly

Insert the pins of the new S slider assembly into the groove of the S rail in the order starting from pin 1 through pin 5 until the S slider assembly is inserted in the S rail holder.

Notes

- Do not make mistake of the order of pins when inserting the them. (The tape guide S2 must be located before the tape guide S1.)
- Do not apply excessive force to the S slider assembly and to the S rail.
- After they are installed, check that the pin heads have not come out off the S rail groove.


S2 tape guide (plastic roller)
S1 tape guide
S slider assembly
S rail
Pin 5
Pin 4
Pin 3
Pin 2
Pin 1
Holder

9. Installing the S rail

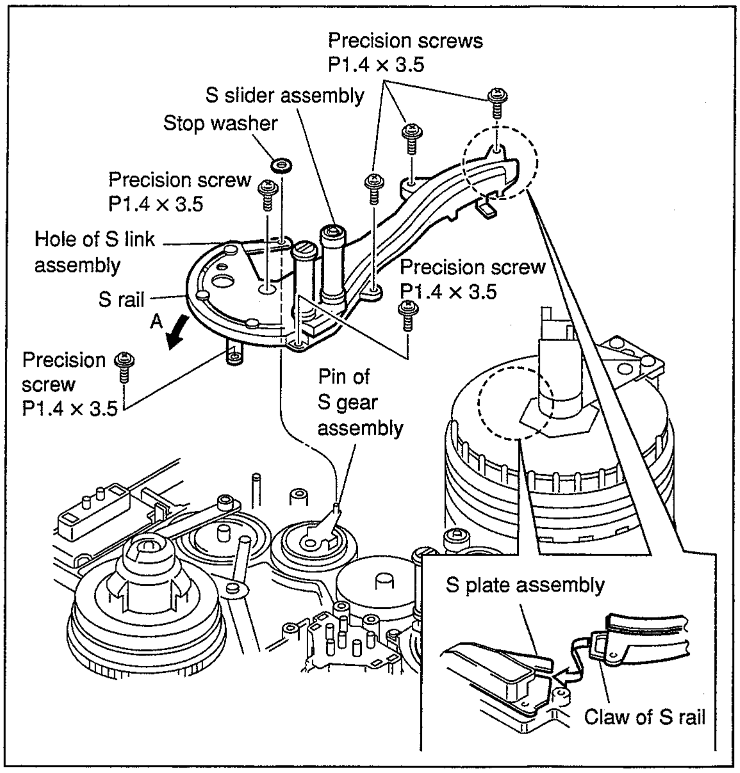
(1) Insert the claw on the rear of the S rail to the bottom of the S plate assembly and lower the front of the S rail in the direction of A.

(2) Insert the pin of the S gear assembly into the hole of the S link assembly and fix it with the new stop washer.

Note

Do not apply excessive force to the S gear assembly when installing the stop washer.

(3) Install the S rail with the six precision screws.
The standard tightening torque value :
10×10^{-2} N•m (1 kgf•cm)


Precision screws
P1.4 x 3.5
S slider assembly
Stop washer
Precision screw
P1.4 x 3.5
Hole of S link assembly
S rail
A
Precision screw
P1.4 x 3.5
Precision screw
P1.4 x 3.5
Pin of S gear assembly
S plate assembly
Claw of S rail

10. Gear chain phase adjustment

(Refer to Section 8-1-8.)

11. Installing the cassette stopper

Install the cassette stopper with the precision screw.
(Refer to Section 7-23.)

12. Installing the threading arm assembly

Install the threading arm assembly with the new stop washer.
(Refer to Section 7-30.)

13. Installing the S-tension regulator assembly

Install the S-tension regulator assembly with the two precision screws.
(Refer to Section 7-21.)

14. Installing the S-tension regulator band assembly

Install the S-tension regulator band assembly with the new stop washer.
(Refer to Section 7-8.)

15. Installing the full top sensor assembly

Install the full top sensor assembly with the precision screw.
(Refer to Section 7-16.)

16. Operation check

Rotate the worm wheel of the gear block assembly with a phillips screwdriver and check that the threading and unthreading operations are performed smoothly.
(Refer to Section 7-1-4.)

Note

Do not rotate the worm wheel more than necessary. Otherwise it may damage the unit.

17. Cleaning the heads and tape running surface

Clean the following places using a cleaning cloth moistened with cleaning fluid.

- Video head (Refer to Section 2-1-2.)
- Upper drum tape running surface (Refer to Section 2-1-2.)
- Lower drum rabbet guide and tape running surface (Refer to Section 2-1-3.)
- All tape guides and pinch roller assembly (Refer to Section 2-1-5.)

Note

After cleaning, be sure to wipe the cleaning fluid off the cleaned portions using a dry cleaning cloth.

Adjustments after Replacement

18. S-tension regulator arm operating position adjustment

(Refer to Section 8-1-2.)

19. FWD back tension adjustment

(Refer to Section 8-1-3.)

20. Tape run adjustment

(Refer to Section 8-2-1.)

7-33. T Slider Assembly Replacement

Overview

Replacement

Removing the full top sensor assembly
Removing the T-tension regulator assembly
Removing the pinch arm assembly
Removing the cassette stopper
Removing the T rail
Removing the T slider assembly
Installing the T slider assembly
Installing the T rail
Gear chain phase adjustment
Installing the cassette stopper
Installing the pinch arm assembly
Installing the T-tension regulator assembly
Installing the full top sensor assembly
Operation check
Cleaning the heads and tape running surface

Adjustment after replacement

Tape run adjustment

Note

Be careful not to touch the drum, tape guides and stationary heads all through the replacement work.

Preparations

1. Turn the POWER switch to OFF.
2. Remove the front lid and outside panel assembly. (Refer to Section 1-4.)
3. Remove the cassette compartment. (Refer to Section 1-9.)
4. Check that the unit is in the unthreading-end state.

Note

The stop washer is used to fix the T slider assembly.
Prepare a new stop washer (3-559-408-11) when replacing it.

Tools

• Torque cassette (FWD back tension) :	J-6323-890-A
• Stop washer fastening tool :	J-6323-530-A
• Cleaning cloth:	3-184-527-01
• Cleaning fluid:	9-919-573-01
• Torque screwdriver bit (for M1.4) :	J-6325-110-A
• Torque screwdriver (for 3 kg) :	J-6325-400-A

Removal

1. Removing the full top sensor assembly

Remove the precision screw and full top sensor assembly.
(Refer to Section 7-16.)

2. Removing the T-tension regulator assembly

Remove the stop washer and remove the T-tension regulator assembly.
(Refer to Section 7-22.)

3. Removing the pinch arm assembly

Remove the stop washer and remove the pinch arm assembly.
(Refer to Section 7-29.)

4. Removing the cassette stopper

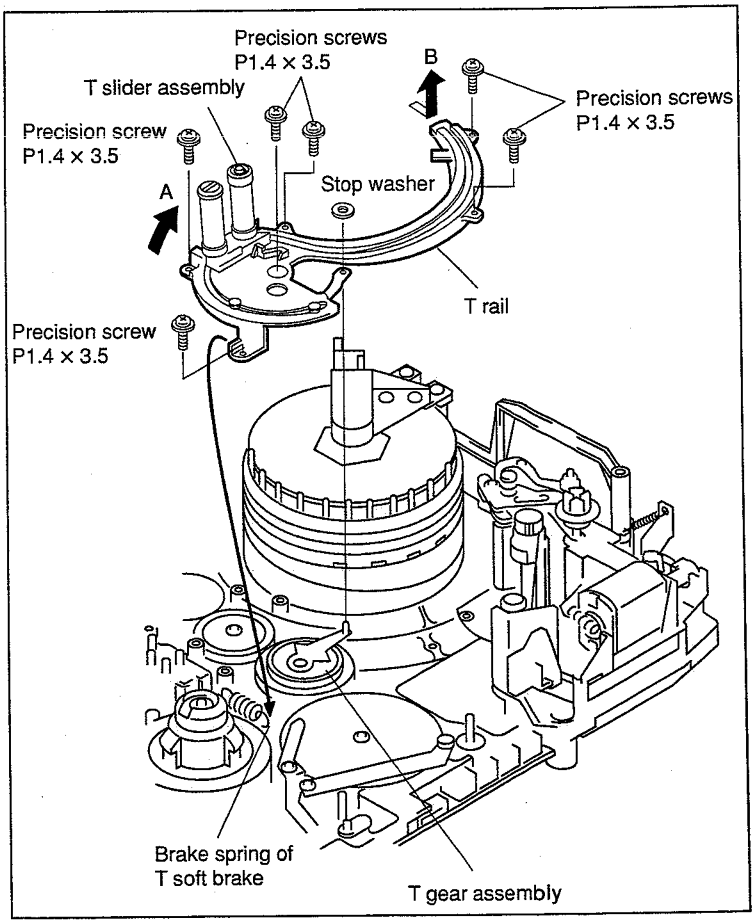
Remove the two precision screws and remove the cassette stopper.
(Refer to Section 7-23.)

5. Removing the T rail

(1) Remove the T soft brake.
(2) Remove the six precision screws and remove the washer.
(3) Raise the front of the T rail in the direction of arrow A first, and then remove the T rail together with the T slider assembly in the direction of arrow B.

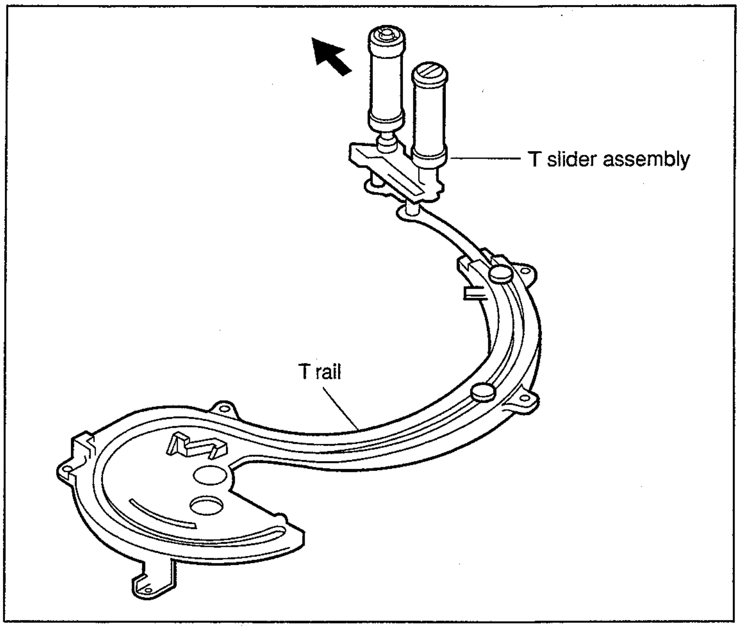
Note

When removing the stop washer, do not apply excessive force to the T gear assembly.


Precision screws
P1.4 x 3.5
B
T slider assembly
Precision screws
P1.4 x 3.5
Precision screw
P1.4 x 3.5
A
Stop washer
T rail
Precision screw
P1.4 x 3.5
Brake spring of
T soft brake
T gear assembly

6. Removing the T slider assembly

Slide the T slider assembly in the direction of the arrow and remove it from the T rail.


T slider assembly
T rail

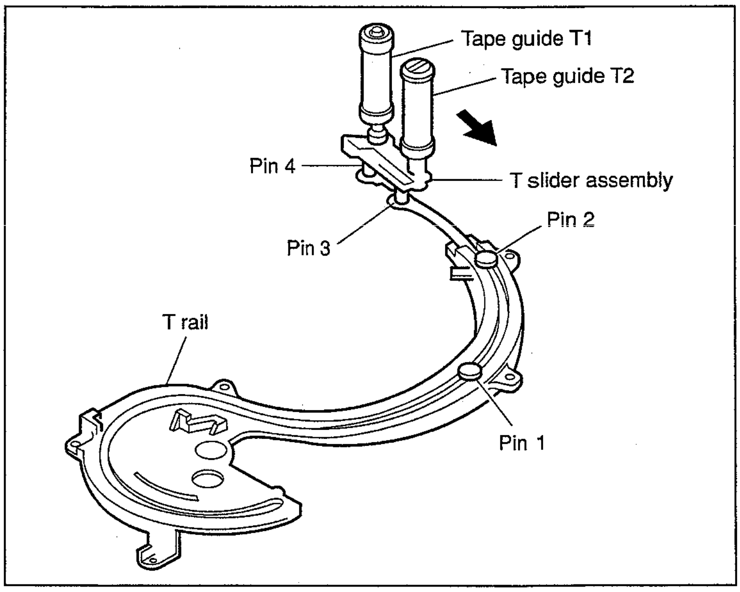
Installation

7. Installing the T slider assembly

Insert the pins of the new T slider assembly into the groove of the T rail in the order starting from pin 1 through pin 4 until the T slider assembly is inserted in the T rail holder.

Notes

- Do not make mistake of the order when inserting the pins. (The tape guide T2 must be located before the tape guide T1.)
- Do not apply excessive force to the T slider assembly and to the T rail.
- After they are installed, check that the pin heads have not come out off the rail groove.


Tape guide T1
Tape guide T2
Pin 4
T slider assembly
Pin 2
Pin 3
T rail
Pin 1

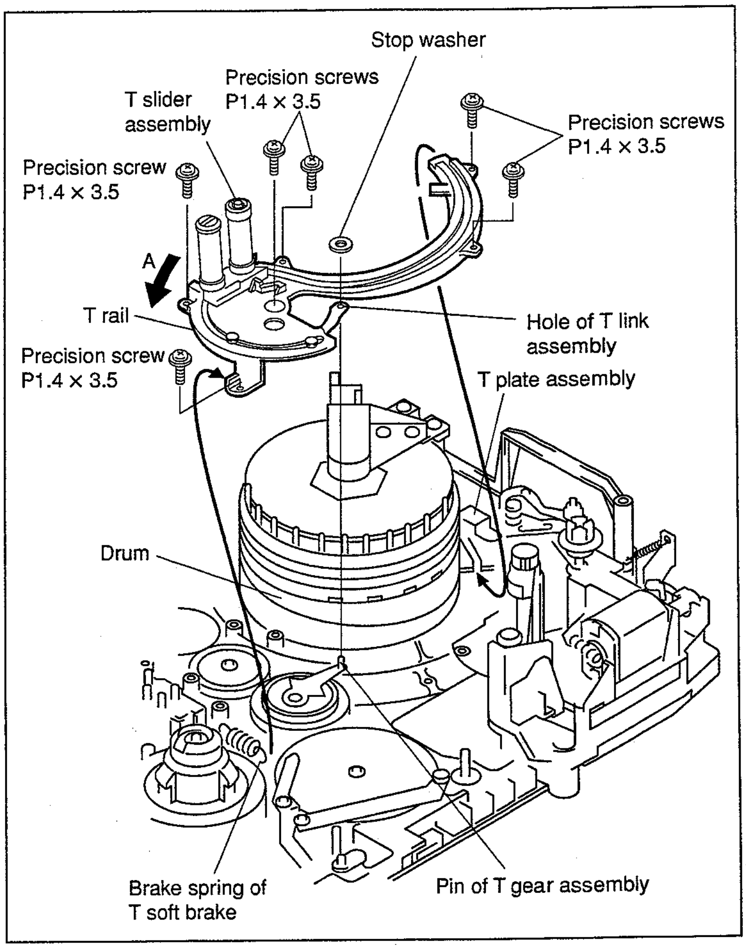
8. Installing the T rail

(1) Insert the claw on the rear of the T rail to the bottom of the T plate assembly and lower the front of the T rail in the direction of A.

(2) Insert the pin of the T gear assembly into the hole of the T link assembly and fix it with the new stop washer.

Note

Do not apply excessive force to the T gear assembly when installing the stop washer.


Stop washer
Precision screws
T slider assembly
P1.4 × 3.5
Precision screws
P1.4 × 3.5
Precision screw
P1.4 × 3.5
A
T rail
Hole of T link assembly
Precision screw
P1.4 × 3.5
T plate assembly
Drum
Brake spring of T soft brake
Pin of T gear assembly

(3) Install the T rail with six screws.
The standard tightening torque value :
10×10^{-2} N•m (1 kgf•cm)

(4) Install the spring of the T soft brake.

9. Gear chain phase adjustment

(Refer to Section 8-1-8.)

10. Installing the cassette stopper

Install the cassette stopper with two precision screws.
(Refer to Section 7-23.)

11. Installing the pinch arm assembly

Install the pinch arm assembly with the new stop washer.
(Refer to Section 7-29.)

12. Installing the T-tension regulator assembly

Install the T-tension regulator assembly with the new stop washer.
(Refer to Section 7-22.)

13. Installing the full top sensor assembly

Install the full top sensor assembly precision screw.
(Refer to Section 7-16.)

14. Operation check

Rotate the worm wheel of the gear block assembly with a phillips screwdriver and check that the threading and unthreading operations are performed smoothly. (Refer to Section 7-1-4.)

Note

Do not rotate the worm wheel more than necessary. Otherwise it may damage the unit.

15. Cleaning the heads and tape running surface

Clean the following places using a cleaning cloth moistened with cleaning fluid.

- Video head (Refer to Section 2-1-2.)
- Tape running surface of upper drum (Refer to Section 2-1-2.)
- Rabbet guide and tape running surface of lower drum (Refer to Section 2-1-3.)
- All tape guides and pinch roller assembly. (Refer to Section 2-1-5.)

Note

After cleaning, be sure to wipe the cleaning fluid off the cleaned portions using a dry cleaning cloth.

Adjustment after Replacement

16. Tape run adjustment

(Refer to Section 8-2-1.)

7-34. Cam Gear Assembly Replacement

Overview

Replacement

Removing the cleaning assembly
Removing the gear block assembly
Removing the full top sensor assembly
Removing the cassette stopper
Removing the drum assembly
Removing the T-tension regulator band assembly
Removing the T-tension regulator assembly
Removing the pinch arm assembly
Removing the TC head assembly
Removing the T slider
Removing the F link assembly
Removing the eject link assembly (A)
Removing the eject link assembly (B)
Removing the cam gear assembly
Cleaning the mount shaft of the cam gear assembly
Applying oil to the mount shaft
Installing the cam gear assembly
Cleaning the mount shaft of eject link assembly
Applying grease to the mount shaft
Applying oil to the joint block
Installing the eject link assembly (B)
Installing the eject link assembly (A)
Cleaning the mount shaft of the F link assembly
Applying oil to the roller
Installing the F link assembly
Installing the T slider assembly
Gear chain phase adjustment
Installing the TC head assembly
Installing the pinch arm assembly
Installing the T-tension regulator assembly
Installing the T-tension regulator band assembly
Installing the drum assembly
Installing the cassette stopper
Installing the full top sensor assembly
Installing the gear block assembly
Installing the cleaning assembly

Preparations

1. Turn the POWER switch to OFF.
2. Remove the front lid and outside panel assembly. (Refer to Section 1-4.)
3. Remove the cassette compartment. (Refer to Section 1-9.)
4. Check that the unit is in the unthreading-end state.

Note

The stop washer is used to fix the cam gear assembly.
Prepare the 10 new stop washers (3-559-408-11) when replacing it.

Note

Cam gear assembly can be replaced when the mechanical deck assembly attaches to the unit..

Tools

• Stop washer fastening tool :	J-6323-530-A
• Cleaning cloth :	3-184-527-01
• Cleaning fluid :	9-919-573-01
• Oil :	7-661-018-18
• Grease (SGL-601) :	7-651-000-10
• Grease (SGL-801) :	7-651-000-11

Removal

1. Removing the cleaning assembly

Remove the precision screw and cleaning assembly.
(Refer to Section 7-6.)

2. Removing the gear block assembly

Remove the three precision screws and remove the gear block assembly.
(Refer to Section 7-24.)

3. Removing the full top sensor assembly

Remove the precision screw and remove the full top sensor assembly.
(Refer to Section 7-16.)

4. Removing the cassette stopper

Remove the two precision screws and remove the cassette stopper.
(Refer to Section 7-23.)

5. Removing the drum assembly

Remove the two screws and remove the drum assembly.
(Refer to Section 7-3.)

6. Removing the T-tension regulator band assembly

Remove the two stop washers and remove the T-tension regulator band assembly.
(Refer to Section 7-9.)

7. Removing the T-tension regulator assembly

Remove the stop washer and remove the T-tension regulator assembly.
(Refer to Section 7-22.)

8. Removing the pinch arm assembly

Remove the stop washer and remove the pinch arm assembly.
(Refer to Section 7-29.)

9. Removing the TC head assembly

Remove the three precision screws and remove the TC head assembly.
(Refer to Section 7-31.)

10. Removing the T slider assembly

Remove the stop washer and remove the six precision screws. Remove the T slider assembly.
(Refer to Section 7-33.)

11. Removing the F link assembly

Remove the stop washer and remove the F link assembly.

12. Removing the eject link assembly (A)

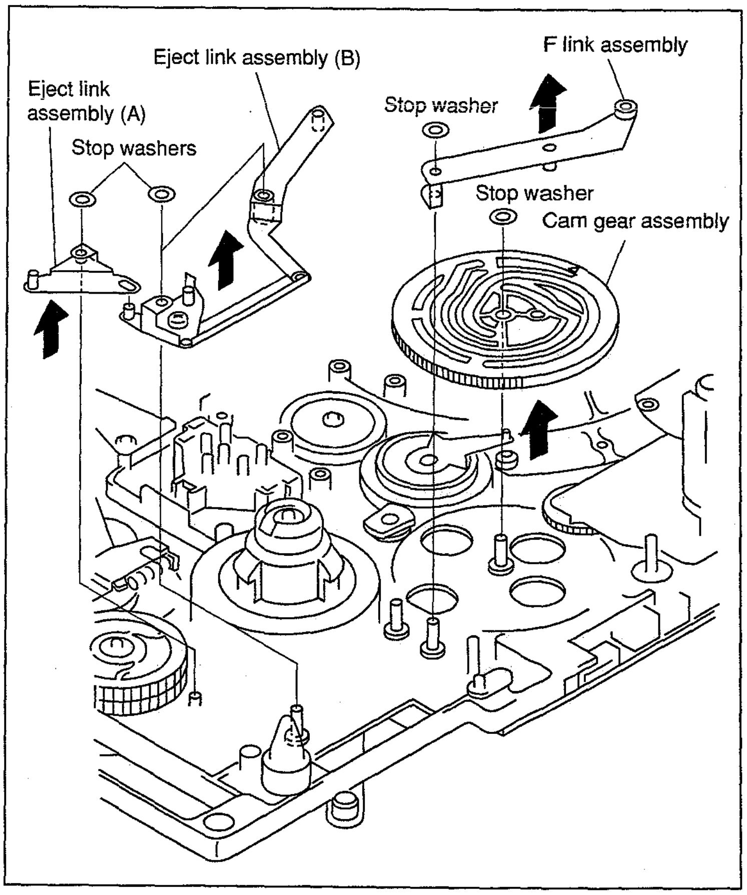
Remove the stop washer and remove the eject link assembly (A).

13. Removing the eject link assembly (B)

Remove the two stop washers and remove the eject link assembly (B).

14. Removing the cam gear assembly

Remove the stop washer and remove the cam gear assembly.



Installation

15. Cleaning the mount shaft of the cam gear assembly

Clean the mount shaft using a cleaning cloth moistened with cleaning fluid.

Note

After cleaning, be sure to wipe the cleaning fluid off the cleaned portions using a dry cleaning cloth.

16. Applying oil to the mount shaft

Apply 1/4 drop of oil to the mount shaft of the cam gear assembly.

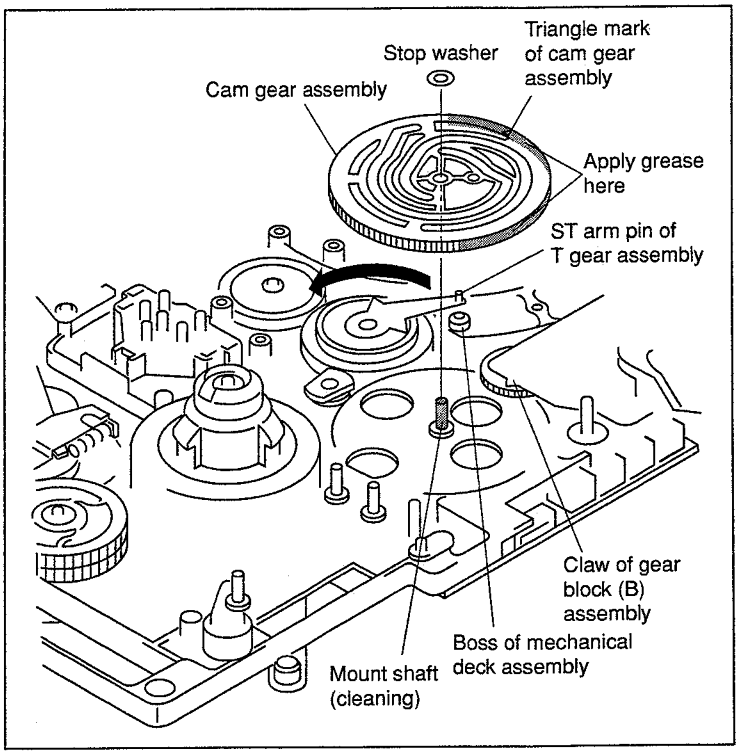
17. Installing the cam gear assembly

(1) Rotate the ST gear arm pin of the T gear assembly counter-clockwise until top of the arm is positioned just on top of the boss of the mechanical deck assembly.

(2) Remove the protection sheet from the new cam gear assembly.

Note

Be careful not to attach the dust and scar on the seal of the cam gear assembly.


Triangle mark of cam gear assembly
Stop washer
Cam gear assembly
Apply grease here
ST arm pin of T gear assembly
Claw of gear block (B) assembly
Boss of mechanical deck assembly
Mount shaft (cleaning)

(3) While aligning the triangle mark of the cam gear assembly with the claw of the gear block (B) assembly, install it to the shaft of the mechanical deck assembly.

(4) Install the new stop washer.

(5) Apply grease to the area (shaded area ▨) of the cam gear assembly.

18. Cleaning the mount shaft of eject link assembly

Clean the mount shaft using a cleaning cloth moistened with cleaning fluid.

Note

After cleaning, be sure to wipe the cleaning fluid off the cleaned portions using a dry cleaning cloth.

19. Applying grease to the mount shaft

Apply grease to the mount shaft of the eject link assembly.

20. Applying oil to the joint block

Applying 1/4 drop of oil to the joint block of the eject link assembly.

21. Installing the eject link assembly (B)

(1) While inserting the brake link shaft of the eject link assembly into the groove of the cam gear assembly as shown, install it to the two shafts of the mechanical deck assembly.
(2) Install the two new stop washers.

22. Installing the eject link assembly (A)

(1) While aligning the link shaft of the eject link assembly (A) with the shaft mechanical deck assembly, install it.
(2) Install the new stop washer.

23. Cleaning the mount shaft of the F link assembly

Clean the mount shaft using a cleaning cloth moistened with cleaning fluid.

Note

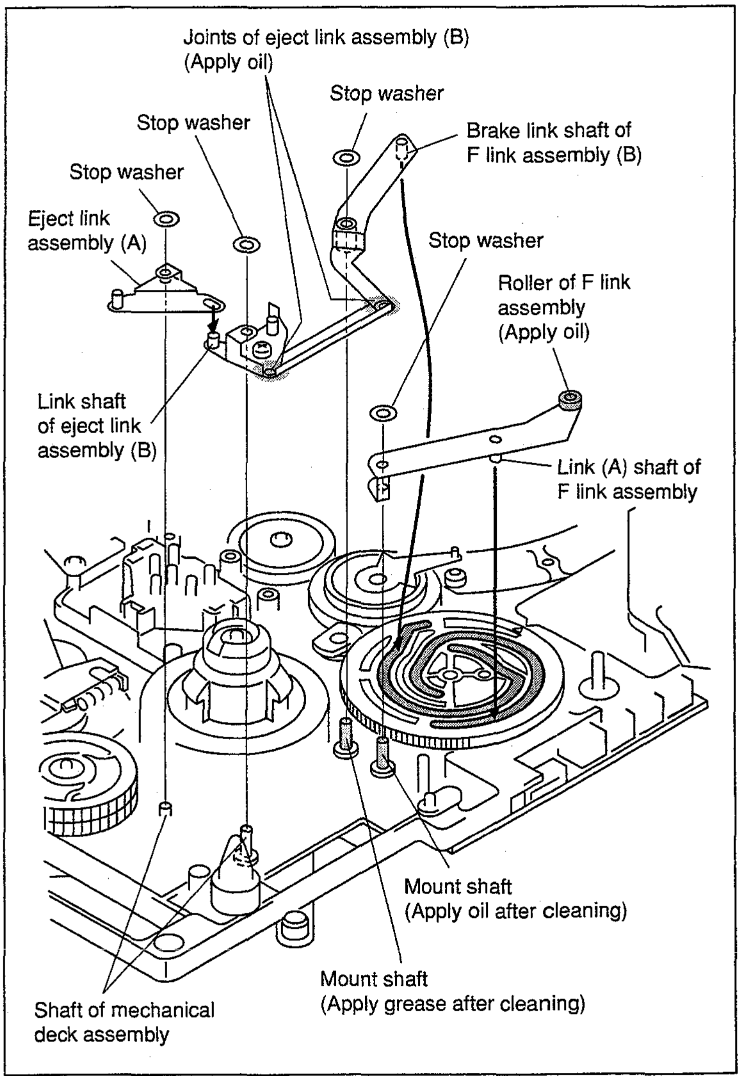
After cleaning, be sure to wipe the cleaning fluid off the cleaned portions using a dry cleaning cloth.

24. Applying oil to the roller

Applying 1/4 drop of oil to the roller of the F link assembly.

25. Installing the F link assembly

(1) While inserting the link (A) shaft of the F link assembly with the groove of the cam gear assembly as shown, install it to the frame shaft.
(2) Install the new stop washer.


Joints of eject link assembly (B) (Apply oil)
Stop washer
Stop washer
Brake link shaft of F link assembly (B)
Stop washer
Eject link assembly (A)
Stop washer
Roller of F link assembly (Apply oil)
Link shaft of eject link assembly (B)
Link (A) shaft of F link assembly
Mount shaft (Apply oil after cleaning)
Mount shaft (Apply grease after cleaning)
Shaft of mechanical deck assembly

26. Installing the T slider assembly

Install the T slider assembly with six precision screws.
(Refer to Section 7-33.)

27. Gear chain phase adjustment

(Refer to Section 8-1-8.)

28. Installing the TC head assembly

Install the TC head assembly with three precision screws.
(Refer to Section 7-31.)

29. Installing the pinch arm assembly

Install the pinch arm assembly with new stop washer.
(Refer to Section 7-29.)

30. Installing the T-tension regulator assembly

Install the T-tension regulator assembly with new stop washer.
(Refer to Section 7-22.)

31. Installing the T-tension regulator band assembly

Install the T-tension regulator band assembly with new stop washer.
(Refer to Section 7-9.)

32. Installing the drum assembly

Install the drum assembly with the two screws.
(Refer to Section 7-3.)

33. Installing the cassette stopper

Install the cassette stopper with two precision screws.
(Refer to Section 7-23.)

34. Installing the full top sensor assembly

Install the full top sensor assembly with precision screw.
(Refer to Section 7-16.)

35. Installing the gear block assembly

Install the gear block assembly with the three precision screws.
(Refer to Section 7-24.)

36. Installing the cleaning assembly

Install the cleaning assembly with the precision screw.
(Refer to Section 7-6.)

7-35. Mechanical Deck Assembly Removal/Installation

Overview

Removal/Installation

Removing the mechanical deck assembly
Installing the mechanical deck assembly

Adjustment after installation

Tape Run Adjustment

Preparations

1. Turn the POWER switch to OFF.
2. Remove the front lid and outside panel assembly. (Refer to Section 1-4.)
3. Open the inside panel assembly. (Refer to Section 1-5.)
4. Removing the plug-in boards (Refer to Section 1-7.)
5. Removing the SS-92 board (Refer to Section 6-20.)

Note

Removal and installation of mechanical deck assembly can be performed in the state that the cassette compartment is being installed in the unit.

Tools

- Hexagon bit (across 1.5 m) : J-6326-120-A
- Torque screwdriver (for 3 kg) : J-6325-400-A

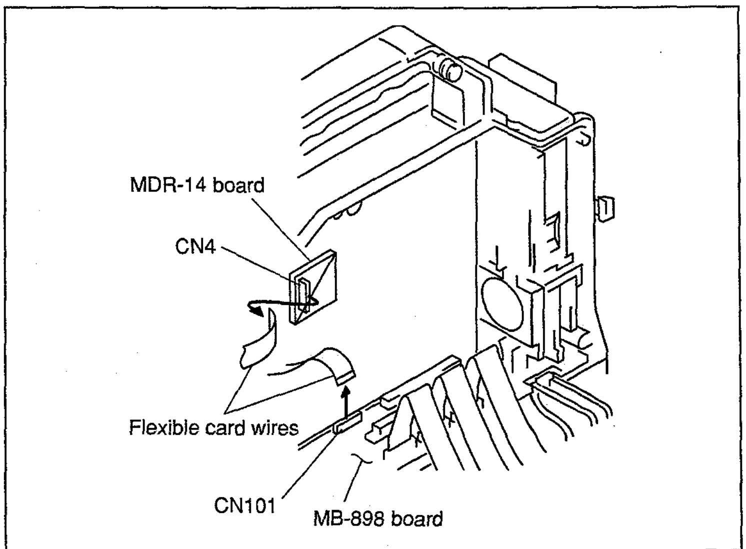
Removal

1. Removing the mechanical deck assembly

(1) Remove the flexible card wire from the connector (CN4) on the MDR-14 board and the connector (CN101) on the MB-898 board.

Note

Life of flexible card wire will be significantly shortened if it is folded. Be very careful not to fold the flexible card wire.

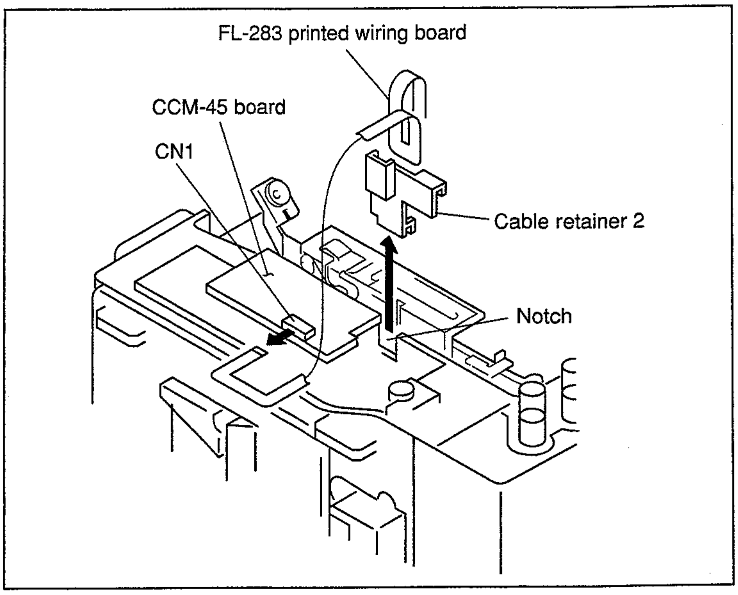


(2) Remove the FL-283 printed wiring board from the connector (CN1) on the CCM-45 board.

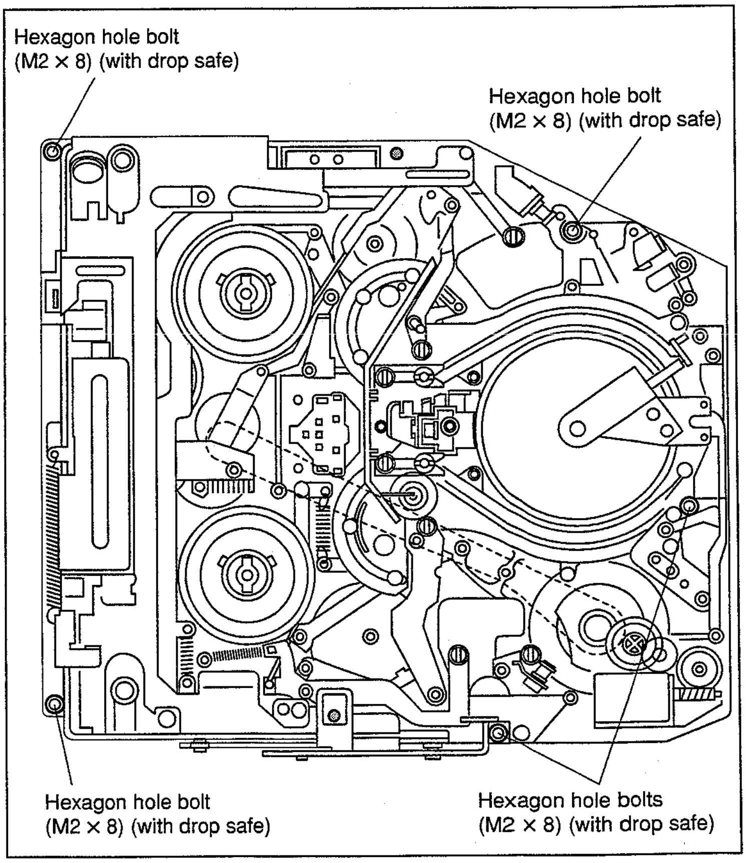
Note

Life of the FL-283 printed wiring board is significantly shortened if folded. Be careful not to fold it.

(3) While removing the cable retainer 2 from the notch, remove the FL-283 printed wiring board and remove it.


FL-283 printed wiring board
CCM-45 board
CN1
Cable retainer 2
Notch

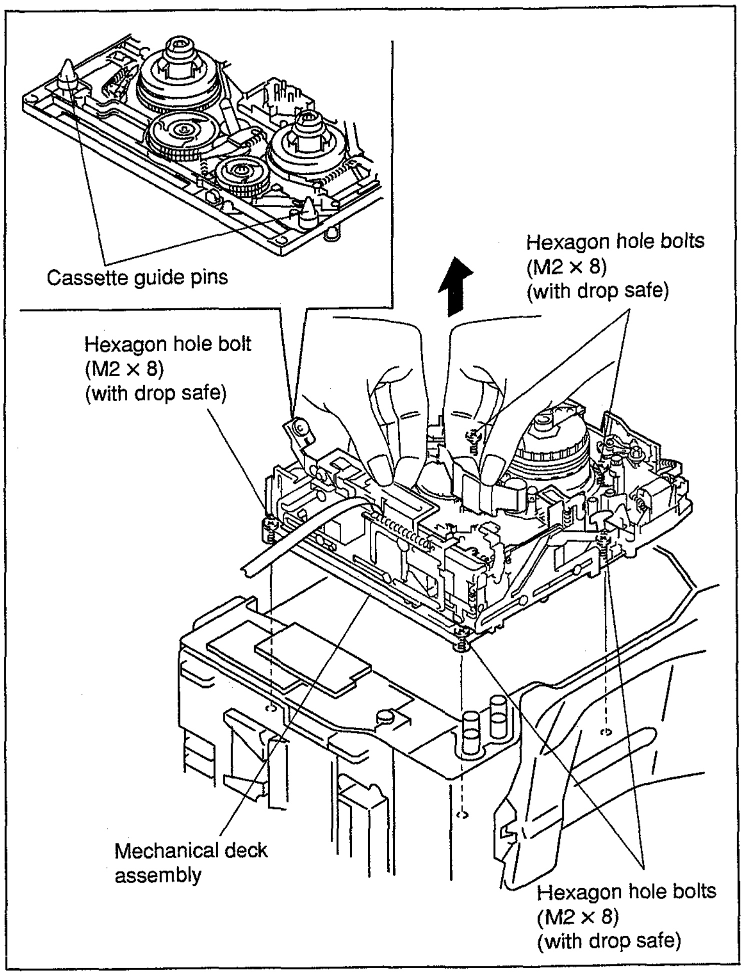
(4) Loosen the five hexagon hole bolts (with drop-safe) completely with hexagon bit.


Hexagon hole bolt
(M2 × 8) (with drop safe)
Hexagon hole bolt
(M2 × 8) (with drop safe)
Hexagon hole bolt
(M2 × 8) (with drop safe)
Hexagon hole bolts
(M2 × 8) (with drop safe)

(5) Hold the cassette stopper and cassette compartment arm, and lift up the mechanical deck assembly gently.

Note

If the cassette compartment assembly is already removed, hold the cassette stopper and cassette guide pin to lift it up.


Cassette guide pins
Hexagon hole bolts
(M2 × 8)
(with drop safe)
Hexagon hole bolt
(M2 × 8)
(with drop safe)
Mechanical deck assembly
Hexagon hole bolts
(M2 × 8)
(with drop safe)

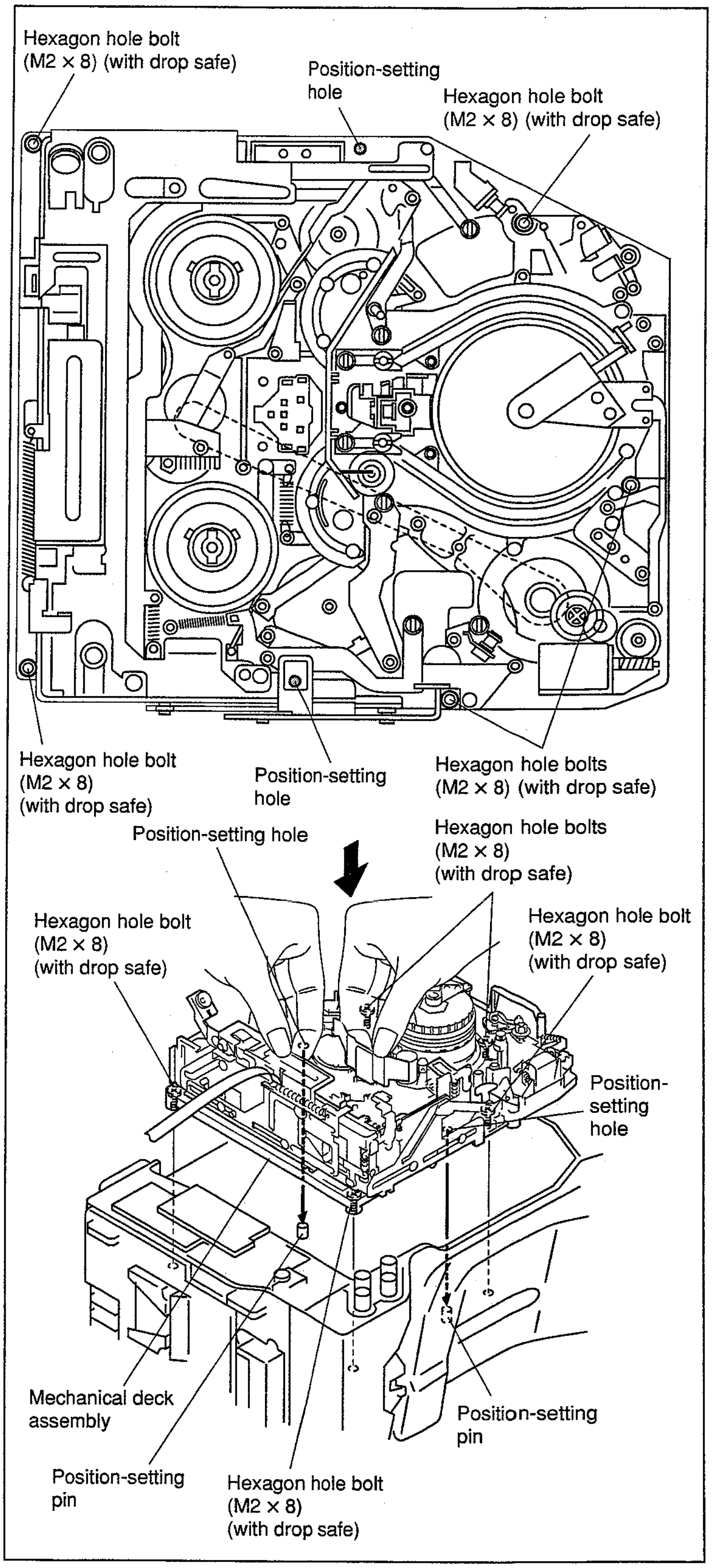
Installation

2. Installing the mechanical deck assembly

(1) Align the position-setting hole with the position-setting pin of the mechanical deck assembly, and install it.

(2) Fix the five hexagon hole bolts (with drop-safe) using the hexagon bit.
The standard tightening torque value :
30×10^{-2} N•m (3 kgf•cm)

(3) Install it by reversing the steps of removal.


Hexagon hole bolt
(M2 x 8) (with drop safe)
Position-setting hole
Hexagon hole bolt
(M2 x 8) (with drop safe)
Hexagon hole bolt
(M2 x 8)
(with drop safe)
Position-setting hole
Hexagon hole bolts
(M2 x 8) (with drop safe)
Position-setting hole
Hexagon hole bolts
(M2 x 8)
(with drop safe)
Hexagon hole bolt
(M2 x 8)
(with drop safe)
Hexagon hole bolt
(M2 x 8)
(with drop safe)
Position-setting hole
Mechanical deck assembly
Position-setting pin
Position-setting pin
Hexagon hole bolt
(M2 x 8)
(with drop safe)

Adjustment after Installation

3. Tape run adjustment

(Refer to Section 8-2.)

7-36. MDC-13A Board Replacement

Overview

Replacement

Removing the mechanical deck assembly
Removing the full top sensor assembly
Removing the end sensor assembly
Removing the cleaning assembly
Removing the gear block assembly
Removing the top sensor assembly
Removing the timing belt
Removing the MDR-14 board
Removing the MDC-13A board
Installing the MDC-13A board
Installing the MDR-14 board
Installing the timing belt
Installing the top sensor assembly
Installing the gear block assembly
Installing the cleaning assembly
Installing the end sensor assembly
Installing the full top sensor assembly
Installing the mechanical deck assembly

Adjustments after replacement

Audio system alignment
Servo system adjustment data initialization
Capstan FG duty ratio adjustment
Capstan add-on recording adjustment
Drum phase adjustment

Preparations

1. Perform steps 1 and 2 of "11-3-6. A91 : MDC-13A BOARD CHANGE".
2. Turn the POWER switch to OFF.
3. Remove the front lid and outside panel assembly. (Refer to Section 1-4.)
4. Open the inside panel assembly. (Refer to Section 1-5.)
5. Removing the plug-in boards (Refer to Section 1-7.)
6. Remove the cassette compartment. (Refer to Section 1-9.)
7. Removing the SS-92 board (Refer to Section 6-20.)

Tools

• Stop washer fastening tool :	J-6323-530-A
• Torque screwdriver bit (for M1.4) :	J-6325-110-A
• Torque screwdriver (for 3 kg) :	J-6325-400-A

Removal

1. Removing the mechanical deck assembly

Loosen the five screws and remove the mechanical deck assembly. (Refer to Section 7-35.)

2. Removing the full top sensor assembly

Remove the precision screw and remove the full top sensor assembly. (Refer to Section 7-16.)

3. Removing the end sensor assembly

Remove the precision screw and remove the end sensor assembly. (Refer to Section 7-15.)

4. Removing the cleaning assembly

Remove the precision screw and remove the cleaning assembly. (Refer to Section 7-6.)

5. Removing the gear block assembly

Remove the three precision screws and remove the gear block assembly. (Refer to Section 7-24.)

6. Removing the top sensor assembly

Remove the precision screw and remove the top sensor assembly. (Refer to Section 7-28.)

7. Removing the timing belt

Removing the timing belt .
(Refer to Section 7-10.)

8. Removing the MDR-14 board

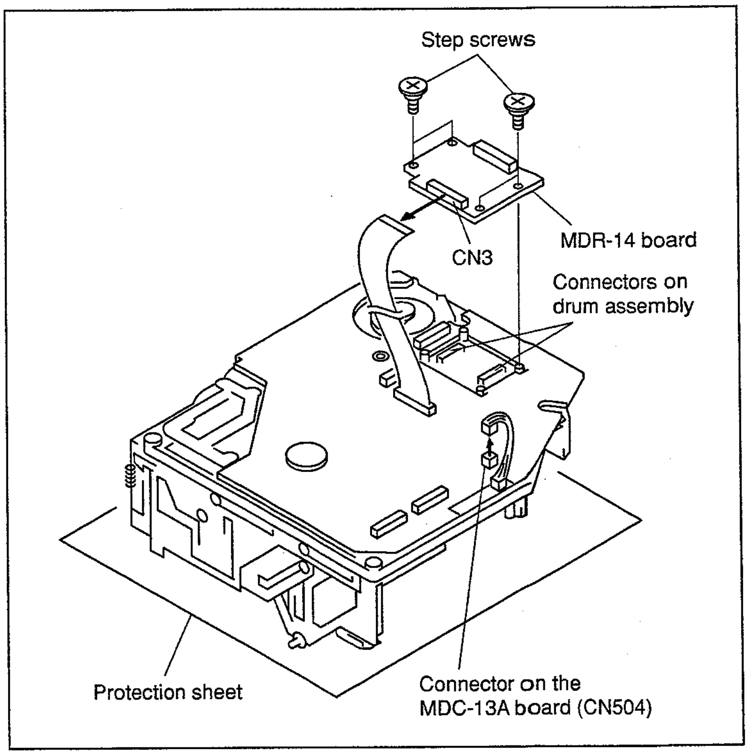
(1) Disconnect the flexible card wire from the connector (CN3) of the MDR-14 board.

Notes

- Life of flexible card wire will be significantly shortened if it is folded. Be very careful not to fold the flexible card wire.
- When the removal work is performed with the mechanical deck assembly removed, place a protection sheet under the mechanical deck assembly.

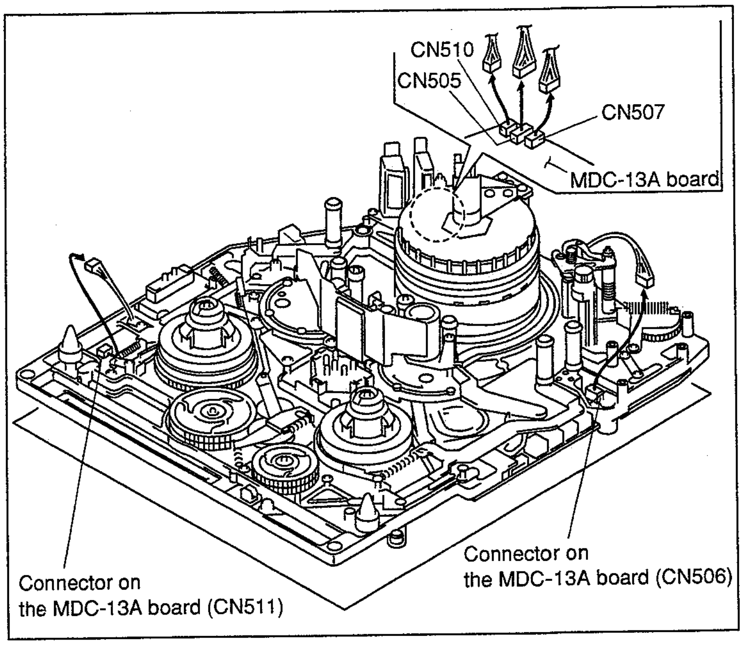
(2) Remove the four steps screws. While removing the connector from the drum assembly, remove the MDR-14 board.

(3) Disconnect the harness from the connector (CN504) of the MDC-13A board.


Step screws
MDR-14 board
CN3
Connectors on drum assembly
Protection sheet
Connector on the MDC-13A board (CN504)

9. Removing the MDC-13A board

(1) Disconnect the harness from the connectors (CN505, CN506, CN507, CN510, CN511) on the MDC-13A board.

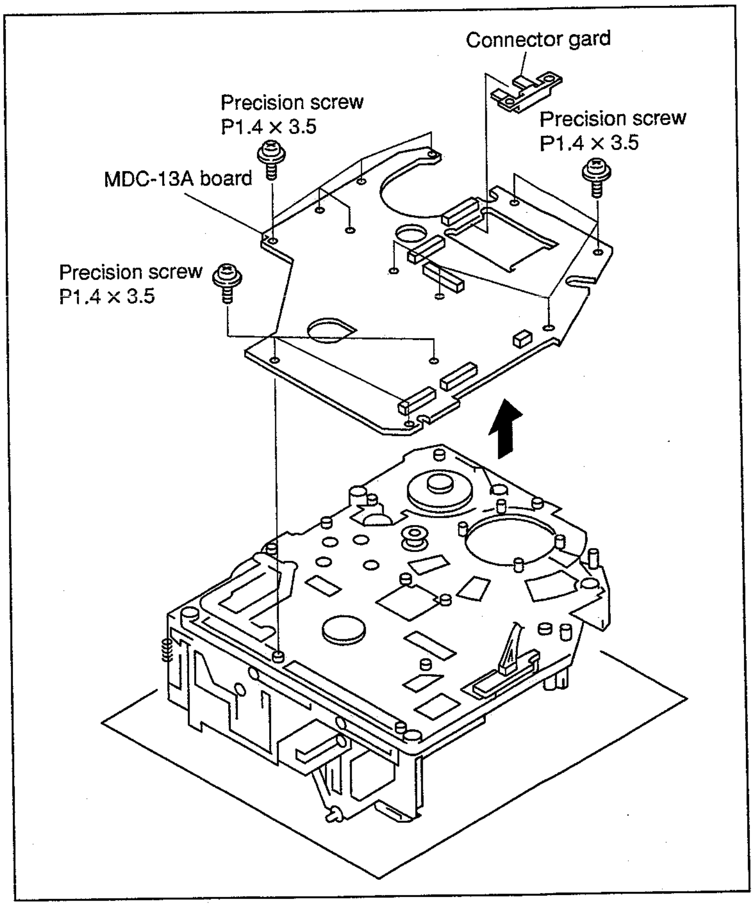

CN510
CN505
CN507
MDC-13A board
Connector on the MDC-13A board (CN511)
Connector on the MDC-13A board (CN506)

(2) Remove the connector gard.

Note

Depending on the time of production at the factory, there are sets that have no connector gard.

(3) Remove the 13 precision screws and remove the MDC-13A board.


Connector gard
Precision screw P1.4 × 3.5
Precision screw P1.4 × 3.5
MDC-13A board
Precision screw P1.4 × 3.5

Installation

10. Installing the MDC-13A board

(1) Align the position-setting hole of the new MDC-13A board with the position-setting pin of the mechanical deck assembly and install it with the 13 precision screws.
The standard tightening torque value :
10×10^{-2} N•m (1 kgf•cm)

(2) Install the connector gard. (Fig.1)

Note

Depending on the time of production at the factory, there are sets that have no connector gard.

11. Installing the MDR-14 board

Install the MDR-14 board by reversing the steps of removal.

12. Installing the timing belt

Install the timing belt.
(Refer to Section 7-10.)

13. Installing the top sensor assembly

Install the top sensor assembly with the precision screw.
(Refer to Section 7-28.)

14. Installing the gear block assembly

Install the gear block assembly with the three precision screws.
(Refer to Section 7-24.)

15. Installing the cleaning assembly

Install the cleaning assembly with the precision screw.
(Refer to Section 7-6.)

16. Installing the end sensor assembly

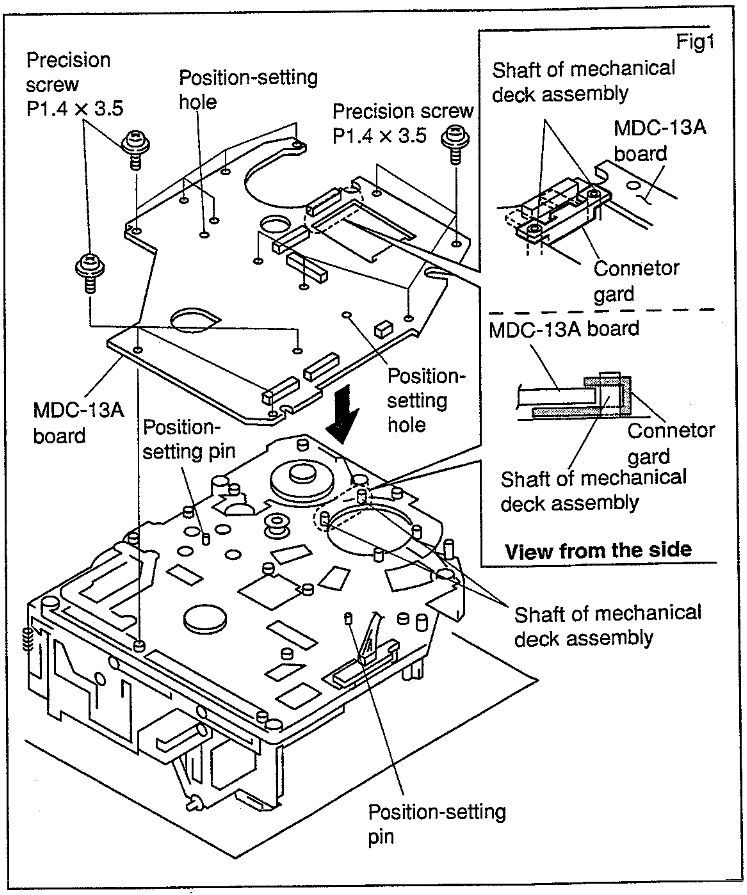
Install the end sensor with precision screw.
(Refer to Section 7-15.)

17. Installing the full top sensor assembly

Install the full top sensor assembly with precision screw.
(Refer to Section 7-16.)

18. Installing the mechanical deck assembly

Install the mechanical deck assembly with five screws.
(Refer to Section 7-35.)


Precision screw P1.4 x 3.5
Position-setting hole
Precision screw P1.4 x 3.5
Fig1
Shaft of mechanical deck assembly
MDC-13A board
Connetor gard
MDC-13A board
Connetor gard
Shaft of mechanical deck assembly
View from the side
Position-setting hole
MDC-13A board
Position-setting pin
Shaft of mechanical deck assembly
Position-setting pin

Adjustments after Replacement

19. Audio system alignment

(Refer to Section 10-2.)

20. Servo system adjustment data initialization

(Refer to Section 10-4-1.)

21. Capstan FG duty ratio adjustment

(Refer to Section 10-4-2.)

22. Capstan add-on recording adjustment

(Refer to Section 10-4-3.)

23. Drum phase adjustment

(Refer to Section 10-4-4.)

Note

Perform the adjustments in the order starting from “21. Capstan FG duty ratio adjustment” and “22. Capstan add-on recording adjustment”.

7-37. Capstan Motor Replacement

Overview

Replacement

Removing the mechanical deck assembly
Removing the cleaning assembly
Removing the gear block assembly
Removing the timing belt
Removing the capstan motor
Installing the capstan motor
Cleaning the capstan motor shaft
Installing the timing belt
Installing the gear block assembly
Installing the cleaning assembly
Installing the mechanical deck assembly
Operation check of the manual eject gear (A)

Adjustments after replacement

Timing belt tension adjustment
Capstan FG duty ratio adjustment
Tape run adjustment
Capstan add-on recording adjustment

Preparations

1. Turn the POWER switch to OFF.
2. Remove the front lid and outside panel assembly. (Refer to Section 1-4.)
3. Open the inside panel assembly. (Refer to Section 1-5.)
4. Removing the Plug-in Boards (Refer to Section 1-7.)
5. Remove the cassette compartment. (Refer to Section 1-9.)
6. Removing the SS-92 Board (Refer to Section 6-20.)

Tools

- Torque screwdriver bit (for M2) : J-6325-380-A
- Torque screwdriver bit (for M1.4) : J-6325-110-A
- Torque screwdriver (for 3 kg) : J-6325-400-A
- Cleaning cloth : 3-184-527-01
- Cleaning fluid : 9-919-573-01

Removal

1. Removing the mechanical deck assembly

Loosen the five screws and remove the mechanical deck assembly.
(Refer to Section 7-35.)

2. Removing the cleaning assembly

Remove the screw and remove the cleaning assembly.
(Refer to Section 7-6.)

3. Removing the gear block assembly

Remove the three precision screws and remove the gear block assembly.
(Refer to Section 7-24.)

4. Removing the timing belt

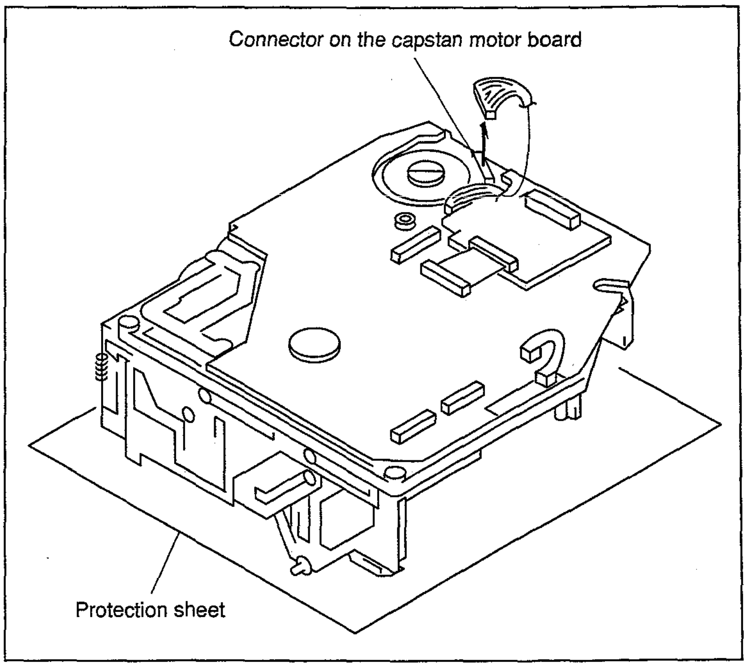
Remove the timing belt.
(Refer to Section 7-10.)

5. Removing the capstan motor

(1) Remove the connector from the capstan printed wiring board.

Note

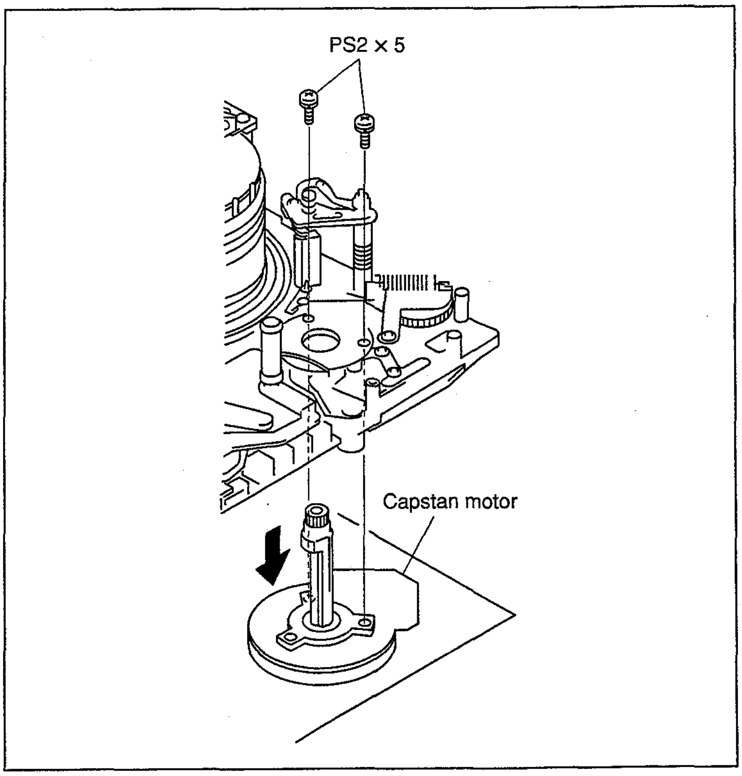
When the capstan motor removal is performed with the mechanical deck assembly removed, place a protection sheet under the mechanical deck assembly.



(2) While holding the capstan motor with hands, remove the two screws from the mechanical deck assembly and remove the capstan motor from the mechanical deck assembly.

Note

Be careful not to drop the capstan motor.



Installation

6. Installing the capstan motor

(1) Install the new capstan motor by reversing the steps of removal.

The standard tightening torque value :

20×10^{-2} N•m (2 kgf•cm)

Note

When inserting the capstan motor through the hole of mechanical deck assembly, be careful not to touch the capstan motor shaft against the mechanical deck assembly. Doing so results in damage to the capstan.

(2) Connect the connector to the capstan printed wiring board that is removed in step 5 (1).

Note

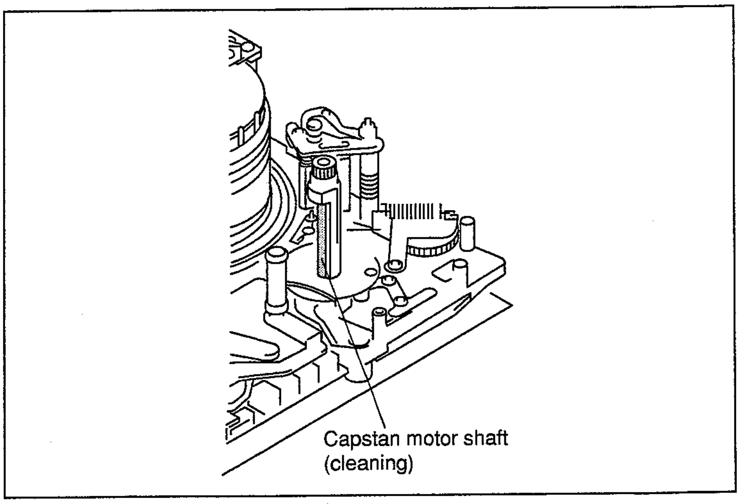
Connection of the connector is easy to forget. Be careful that the connector is re-connected.

7. Cleaning the capstan motor shaft

Clean the capstan motor shaft using a cleaning cloth moistened with cleaning fluid.

Note

After cleaning, be sure to wipe the cleaning fluid off the cleaned portions using a dry cleaning cloth.



8. Installing the timing belt

Install the timing belt. (Refer to Section 7-10.)

9. Installing the gear block assembly

Install the gear block assembly with the three precision screws. (Refer to Section 7-24.)

10. Installing the cleaning assembly

Install the cleaning assembly with the precision screw. (Refer to Section 7-6.)

11. Installing the mechanical deck assembly

Installing the mechanical deck assembly with five screws. (Refer to Section 7-35.)

12. Operation check of the manual eject gear (A)

Rotate the manual eject gear (A) of the gear block assembly with a phillips screwdriver and check that the threading and unthreading operations are performed smoothly. (Refer to Section 7-1-4.)

Note

Do not rotate the manual eject gear (A) more than necessary. Otherwise it may damage the unit.

Adjustments after Replacement

13. Timing belt tension adjustment

(Refer to Section 8-1-5.)

14. Capstan FG duty ratio adjustment

(Refer to Section 10-4-2.)

15. Tape run adjustment

(Refer to Section 8-2.)

16. Capstan add-on recording adjustment

(Refer to Section 10-4-3.)

Note

Perform the above adjustments in the order starting from “14. Capstan FG duty ratio adjustment” , “15.Tape run adjustment ” and “16. Capstan add-on recording adjustment ”

Section 8
Mechanical Adjustment

8-1. Mechanical Adjustment

1. Automatic adjustment of mechanism

This unit has the automatic adjustment function as the mechanism adjustment menu in addition to the other adjustment menus and self-diagnosis.
The respective menus of the automatic adjustment are shown on viewfinder and the video monitor which is connected to the TEST OUT connector.
The mechanical adjustment consists of the menu and submenus. It has the following structure.

Menu	Submenu	Adjustment item
A4 : MECHANISM ADJUST	A40 : PATH MODE SEL	× 1 REV SEARCH REC HEAD PB SLACK MUTE CASSE ID MUTE
	A41 : DRUM PHASE	

2. Mechanism adjustment mode (A4 : MECHANISM ADJUST)

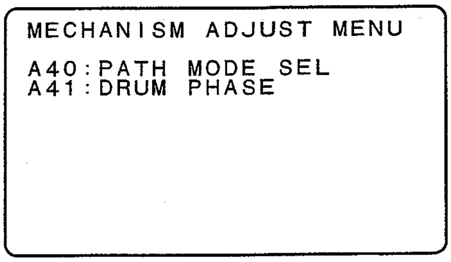
This menu sets the items that are required for mechanism adjustment.

Note

Implement this menu item before starting the mechanism adjustment.

Operating procedure

1. Let the display show the top menu of VTR MAINTE menu. (Refer to Section 11-2-2.)
2. Press the rotary encoder. (When a cassette tape is inserted, it is ejected automatically.)
3. Select A4 : MECHANISM ADJUST and press the rotary encoder. The message " MECHANISM ADJUST MENU" appears.

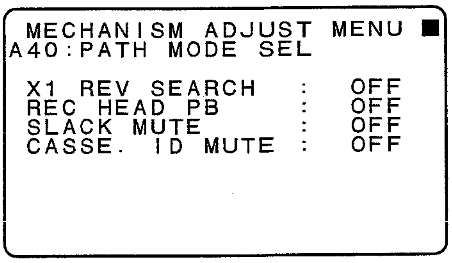


```
MECHANISM ADJUST MENU

A40:PATH MODE SEL
A41:DRUM PHASE
```

A40 : PATH MODE SEL

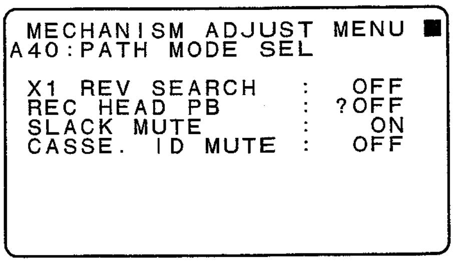
Contents of this menu item are all saved even after the VTR maintenance menu is set to OFF. However, the contents return to OFF when the POWER switch is turned to OFF.

1. Select "A40 : PATH MODE SEL" on the MECHANISM ADJUST MENU display and press the rotary encoder.
2. Select the desired item to change its setting and press the rotary encoder.



```
 MECHANISM ADJUST MENU ■
A40:PATH MODE SEL

 X1 REV SEARCH   :   OFF
 REC HEAD PB     :   OFF
 SLACK MUTE      :   OFF
 CASSE. ID MUTE  :   OFF
```

3. The question mark (?) appears in the left of the ON/OFF.
4. Rotate the rotary encoder to switch ON/OFF. Press the rotary encoder to set ON/OFF.



```
 MECHANISM ADJUST MENU ■
A40:PATH MODE SEL

 X1 REV SEARCH   :   OFF
 REC HEAD PB     :  ?OFF
 SLACK MUTE      :    ON
 CASSE. ID MUTE  :   OFF
```

Setting contents of each menu item

×1 REV SEARCH	OFF :	−4 times speed (normal SEARCH speed)
	ON :	−1 time speed
REC HEAD PB	OFF :	Normal playback
	ON :	Playback from the recording head
SLACK MUTE	OFF :	When an error occurs, an error code appears in the display window and the unit stops its operation.
	ON :	When an error occurs, an error code is not displayed and the unit does not stop its operation.
CASSE. ID MUTE	OFF :	Only the HD cassette tape and a cleaning cassette tape can be accepted.
	ON :	Any types of cassette tape can be accepted.

A41 : DRUM PHASE

This menu item is exactly same as those of "11-3-3. SERVO System Adjustment Mode (A003 : DRUM PHASE)". Refer to Section 11-3-3.

8-1-1. Reel Table Height Adjustment

Notes

- Height of reel tables becomes the reference of the entire tape running system. When reel table is replaced, be sure to perform the reel table height adjustment.
- The three polywashers are used under and above the S and T reel tables.
  The polywasher that is attached above a reel table is reserved as the spare polywasher in case of need after reel table is replaced.
  Be careful not to lose or damage the polywashers.
  Polywasher t0.25 (1 piece) : 3-303-961-11
  Polywasher t0.13 (2 pieces) : 3-303-961-01
- For the S and T reel table replacement, refer to Section 7-25.

Preparations

1. Turn the POWER switch to OFF.
2. Remove the front lid and the outside panel assembly. (Refer to Section 1-4.)
3. Remove the cassette compartment. (Refer to Section 1-9.)

Tools

- Reel table height gauge : J-6324-150-A
- Cassette reference plate : J-7032-610-C

Adjustment Procedure

1. Installing the cassette reference plate

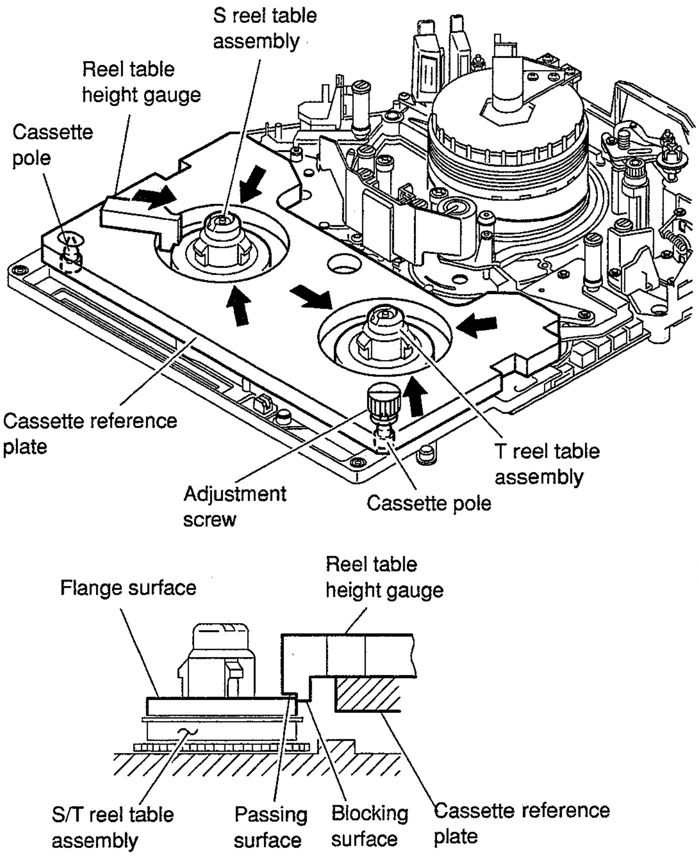
Install the cassette reference plate to fit the cassette poles (2 poles).
Rotate the adjustment screws of the cassette reference plate until the cassette reference plate has no play.

2. Reel table height check

Move the reel table height gauge at every about 120 degrees on the flange surface of the S and T reel table assemblies. Check to see that the specification is satisfied.
If the specification is not satisfied, adjust it by performing step 3.

3. Reel table height adjustment

Adjust the reel table height by increasing/decreasing the number of polywashers under the reel table.
If height of reel table is lower than the specifications :
Remove the polywasher above the reel table and insert it under the reel table.
If height of reel table is higher than the specifications :
Remove the polywasher under the reel table and insert it above the reel table.
Confirm again that the specification is satisfied.


S reel table assembly
Reel table height gauge
Cassette pole
Cassette reference plate
Adjustment screw
Cassette pole
T reel table assembly
Flange surface
Reel table height gauge
S/T reel table assembly
Passing surface
Blocking surface
Cassette reference plate

Specifications : The reel table height gauge must pass the passing surface and must be blocked by the blocking surface.

- Height difference between the blocking surface and passing surface : 0.2 mm

8-1-2. S Tension Regulator Operating Position Adjustment

Note

When the S-tension regulator band assembly and the S reel table assembly is replaced, be sure to perform the S tension regulator operating position adjustment.

Preparations

1. Turn the POWER switch to OFF.
2. Remove the front lid and the outside panel assembly. (Refer to Section 1-4.)

Tools

• Torque screwdriver bit (for M2) :	J-6325-380-A
• Torque screwdriver (for 3 kg) :	J-6325-400-A

Check Procedure

1. Setting up the mode

Rotate the manual eject gear (A) counter-clockwise until the unit reaches the threading-end state.
(Refer to Section 7-1-4.)

2. S Tension Regulator Operating Position Check

Confirm that the round hole of the S tension regulator assembly can be viewed through the square hole of the end sensor holder.

Note

Check that the round hole is not damaged when viewed from the top.

If the specification is not satisfied, perform adjustment as described in step 3.

Adjustment Procedure

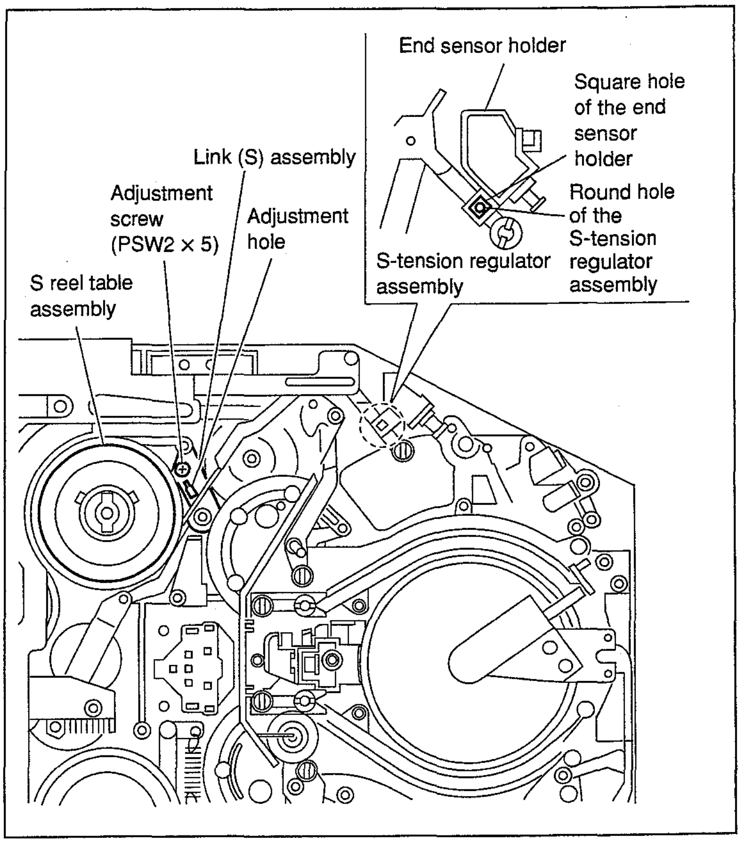
3. S tension regulator operating position adjustment

(1) Loosen the adjustment screw of the link (S) assembly by 1/2 turn.

(2) Insert the 3 mm flat head screwdriver tip into the adjustment hole of the link (S) assembly and adjust position of the link (S) assembly until the specification is satisfied.

(3) While maintaining the screwdriver setup as step (2), tighten the adjustment screw of the link (S) assembly.
Standard tightening torque :
20×10^{-2} N•m (2.0 kgf•cm)

(4) Confirm that the operating position of the tension regulator satisfies the specifications, following step (2).


End sensor holder
Square hole of the end sensor holder
Round hole of the S-tension regulator assembly
S-tension regulator assembly
Link (S) assembly
Adjustment screw (PSW2 x 5)
Adjustment hole
S reel table assembly

4. Releasing the mode

Rotate the manual eject gear (A) clockwise until the unit reaches the unthreading-end state.
(Refer to Section 7-1-4.)

5. S5 tape guide height check

(Refer to Section 8-2-1.)

6. FWD back tension adjustment

(Refer to Section 8-1-3.)

8-1-3. FWD Back Tension Adjustment

Note

When the S-tension regulator band assembly or the S reel table assembly is replaced, or when the S tension regulator operating position adjustment is performed, be sure to perform the FWD back tension adjustment.

Preparations

Remove the front lid and the outside panel assembly. (Refer to Section 1-4.)

Note

This adjustment is recommended to be performed with the cassette compartment installed.
If the cassette compartment is not installed, the photo interrupter (cassette compartment lock switch) on the MDC-13A board must be covered by a piece of black paper to interrupt the incoming light to establish the cassette-lock state. At the same time, place a weight on top of cassette tape so that the cassette tape will not be raised out of position for this adjustment.
For the cassette compartment lock switch, refer to “7-1-3. Threading-End State/ Unthreading-End State”.

Tool

Torque cassette (FWD back tension) : J-6323-890-A

Check Procedure

Set the CASSE. ID MUTE to ON using the VTR maintenance menu, A40 : PATH MODE SEL. (Refer to Section 11-3-5.)

1. Enter the REC state

(1) Turn the POWER switch to OFF.
(2) Insert the torque cassette (FWD back tension) and press the REC button to enter the REC state.

2. FWD back tension check

Check that the supply side meter reading of the torque cassette (FWD back tension) satisfies the specifications.
If the specification is not satisfied, check whether the value is larger or small than the specified value and then go to step 3.

Adjustment Procedure

3. Enter the EJECT state

(1) Press the REC button to release the REC state.
(2) Press the EJECT button and remove the torque cassette (FWD back tension).

4. Back tension adjustment

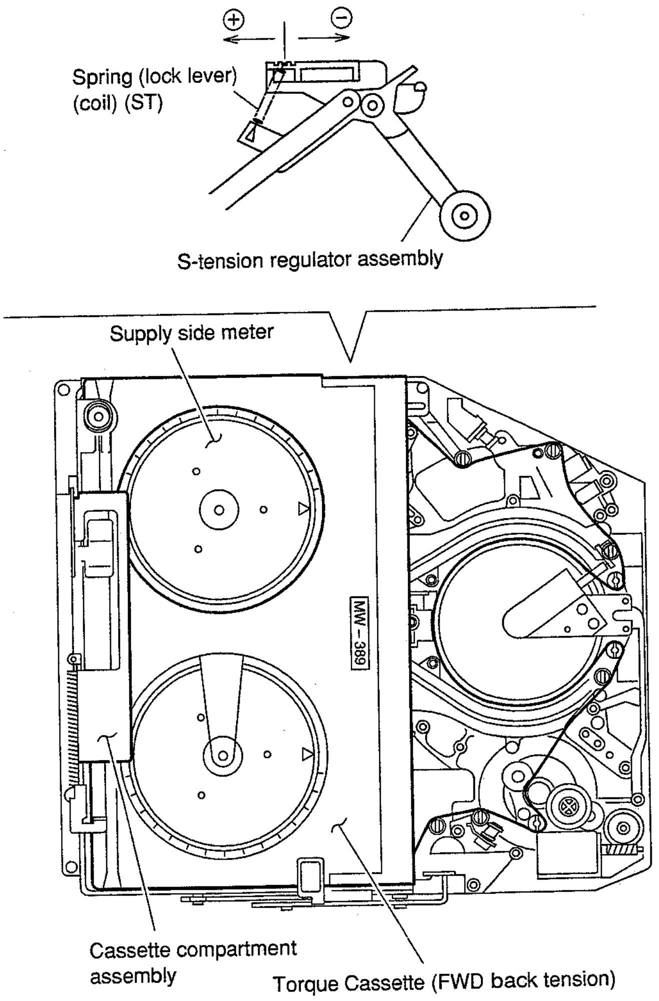
Change the hook position to which the spring (lock lever) (coil) (ST) of the S-tension regulator assembly is engaged.

Adjustment point

- When the tension is larger than the specified value, change the hook position in the direction of [−] to which the spring (lock lever) (coil) (ST) is engaged.
- When the tension is smaller than the specified value, change the hook position in the direction of [+] to which the spring (lock lever) (coil) (ST) is engaged.

5. FWD back tension check after adjustment

Perform steps 1 and 2 of the check procedure and confirm that the specification is satisfied.


⊕
⊖
Spring (lock lever) (coil) (ST)
S-tension regulator assembly
Supply side meter
MW-389
Cassette compartment assembly
Torque Cassette (FWD back tension)

Specifications : 0.0044 ±0.0004 N•m
(44 ±4 gf•cm)

8-1-4. REV Back Tension Adjustment

Note

When the T-tension regulator band assembly or the T reel table assembly is replaced, or when the T tension regulator operating position adjustment is performed, be sure to perform the REV back tension adjustment.

Preparations

Remove the front lid and the outside panel assembly. (Refer to Section 1-4.)

Note

This adjustment is recommended to be performed with the cassette compartment installed.
If the cassette compartment is not installed, the photo interrupter (cassette compartment lock switch) on the MDC-13A board must be covered by a piece of black paper to interrupt the incoming light to establish the cassette-lock state. At the same time, place a weight on top of cassette tape so that the cassette tape will not be raised out of position for this adjustment.
For the cassette compartment lock switch, refer to "7-1-3. Threading-End State/ Unthreading-End State".

Tool

Torque cassette (FWD back tension) : J-6323-890-A

Check Procedure

Set the CASSE. ID MUTE to ON using the VTR maintenance menu, A40 : PATH MODE SEL. (Refer to Section 11-3-5.)

1. Enter the REV × 1 state

(1) Turn the POWER switch to OFF.
(2) Insert the torque cassette (FWD back tension).
(3) Set the × 1 REV SEARCH to ON using the VTR maintenance menu, A40 : PATH MODE SEL.
(4) After pressing the PLAY button, press the REW button.
(Both the PLAY and REW buttons on the keyboard turn on.)
By doing this, the unit enters the REV × 1 state.

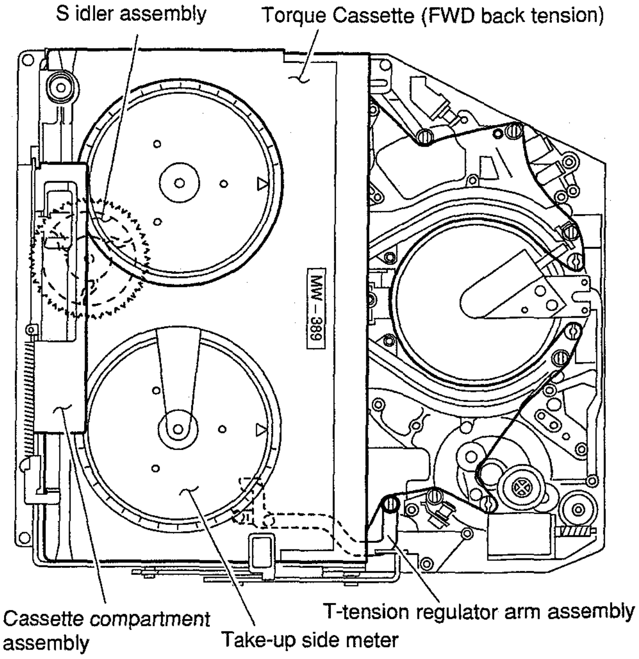
2. REV back tension

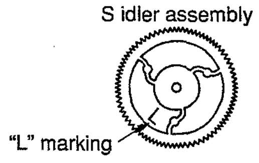
Check that the take-up side meter reading of the torque cassette (FWD back tension) satisfies the specifications.

Note

The REV back tension specification is different depending on the types of S idler assembly if the "L" mark is inscribed on the S idler assembly or not as shown in the illustration.

If the specification is not satisfied, check whether the value is larger or small than the specified value, and then go to step 3.


S idler assembly
Torque Cassette (FWD back tension)
MW-389
Cassette compartment assembly
Take-up side meter
T-tension regulator arm assembly


S idler assembly
"L" marking

T5 Tape guide	The "L" marking is inscribed on the S idler assembly	Specification
Metallic	YES	0.0049 ±0.001 N•m (50 ±11 gf•cm)
White	YES	0.00627 ±0.0011 N•m (64 ±11 gf•cm)
	NO	0.0068 ±0.0007 N•m (69 ±7 gf•cm)

Adjustment Procedure

3. Enter the EJECT state

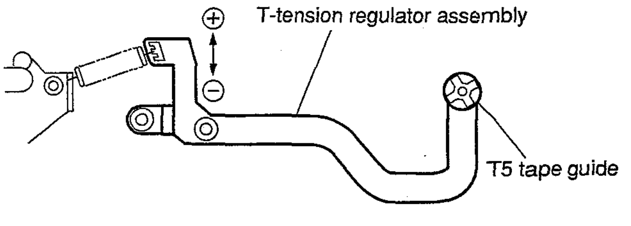
(1) Press the STOP button to exit the REV × 1 state.
(2) Press the EJECT button to remove the torque cassette (FWD back tension).

4. Back tension adjustment

Change the hook position to which the adjustment spring of the T-tension regulator assembly is engaged.

Adjustment point

- When the tension is larger than the specified value, change the hook position in the direction of [−] to which the spring is engaged.
- When the tension is smaller than the specified value, change the hook position in the direction of [+] to which the spring is engaged.


⊕
⊖
T-tension regulator assembly
T5 tape guide

5. REV back tension check after the adjustment

Perform steps 1 and 2 of the check procedure and confirm that the specification is satisfied.

8-1-5. Timing Belt Tension Adjustment

Note

When the reel drive gear assembly or capstan motor of timing belt is replaced, be sure to adjust the belt tension.

Preparations

1. Confirm that the unit is in the unthreading-end state.
2. Remove the front lid and the outside panel assembly. (Refer to Section 1-4.)

Tools

- Torque screwdriver bit (for M1.4) : J-6325-110-A
- Torque screwdriver (for 3 kg) : J-6325-400-A

Adjustment Procedure

1. Timing belt tension adjustment

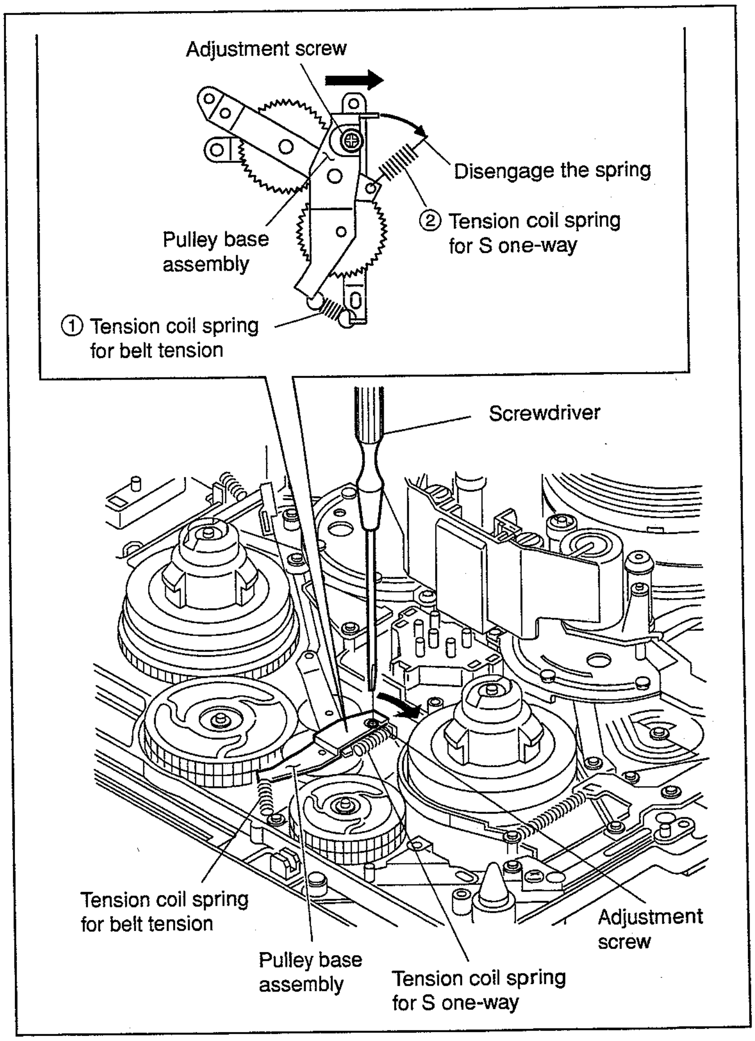
Note

Belt tension is automatically determined by the tension coil spring for belt tension ① in the illustration.

(1) Disengage the tension coil spring from the hook as shown ② in the illustration.

(2) Loosen the adjustment screw of the reel drive gear assembly by 1/2 turn to 1 turn.

(3) Push the pulley base assembly in the direction of the arrow. While holding the pulley base assembly with hands so as not to be raised from the position that is returned by the spring force, tighten the adjustment screw.
Standard tightening torque :
10×10^{-2} N•m (1.0 kgf•cm)


Adjustment screw
Disengage the spring
② Tension coil spring for S one-way
Pulley base assembly
① Tension coil spring for belt tension
Screwdriver
Tension coil spring for belt tension
Pulley base assembly
Tension coil spring for S one-way
Adjustment screw

8-1-6. T Tension Regulator Operating Position Adjustment

Note

When the T-tension regulator band assembly and the T reel table assembly is replaced, be sure to perform the T tension regulator operating position adjustment.

Preparations

1. Turn the POWER switch to OFF.
2. Remove the front lid and the outside panel assembly. (Refer to Section 1-4.)
3. Remove the cassette compartment. (Refer to Section 1-9.)
4. Confirm that the unit is in the unthreading-end state.

Tools

- Torque screwdriver bit (for M2) : J-6325-380-A
- Torque screwdriver (for 3 kg) : J-6325-400-A

Check Procedure

1. Setting up the mode

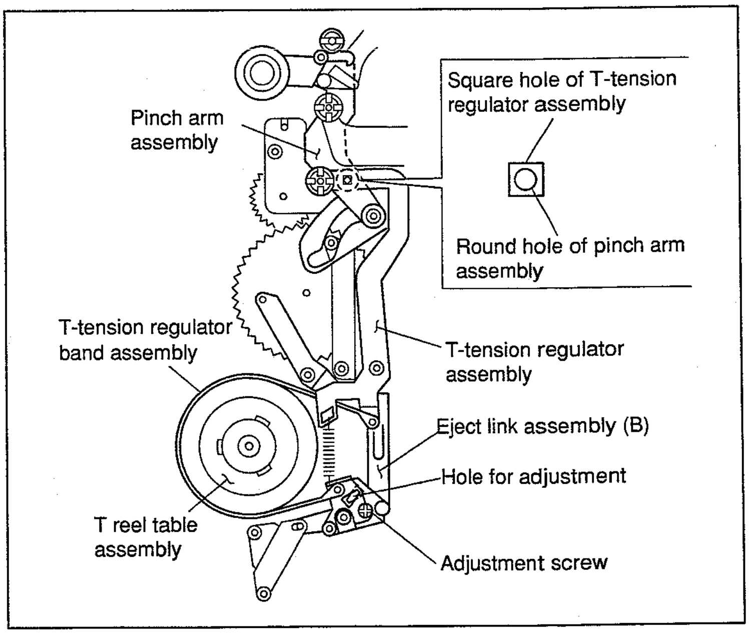
Rotate the manual eject gear (A) counter-clockwise until the unit reaches the threading-end state. (Refer to Section 7-1-3.)

2. T tension regulator operating position check

Specifications :
The round hole of the pinch arm assembly can be viewed through the square hole of the T tension regulator assembly.

Notes

- Check that the round hole is not damaged when viewed from the top.
- If the specification is not satisfied, perform adjustment as described in step 3.


Pinch arm assembly
Square hole of T-tension regulator assembly
Round hole of pinch arm assembly
T-tension regulator band assembly
T-tension regulator assembly
Eject link assembly (B)
Hole for adjustment
T reel table assembly
Adjustment screw

Adjustment Procedure

3. T tension regulator operating position adjustment

(1) Loosen the adjustment screw of the eject link assembly (B) by 1/2 turn.

(2) Insert the 3 mm flat head screwdriver tip into the adjustment hole of the eject link assembly (B) and adjust position of the eject link assembly (B) until the specification is satisfied.

(3) While maintaining the screwdriver setup as step (2), tighten the adjustment screw of the eject link assembly (B).
Standard tightening torque : 20×10^{-2} N•m (2.0 kgf•cm)

(4) Confirm that the operating position of the T tension regulator satisfies the specifications.

4. Releasing the mode

Rotate the manual eject gear (A) clockwise until the unit reaches the unthreading-end state. (Refer to Section 7-1-4.)

5. REV back tension adjustment

(Refer to Section 8-1-4.)

8-1-7. S3 Guide Height Adjustment

Note

Height of S3 guides becomes the reference of the entire tape running system. When threading arm assembly is replaced, be sure to perform the S3 guide height adjustment.

Preparations

1. Confirm that the unit is in the unthreading-end state.
2. Turn the POWER switch to OFF.
3. Remove the front lid and the outside panel assembly. (Refer to Section 1-4.)

Tools

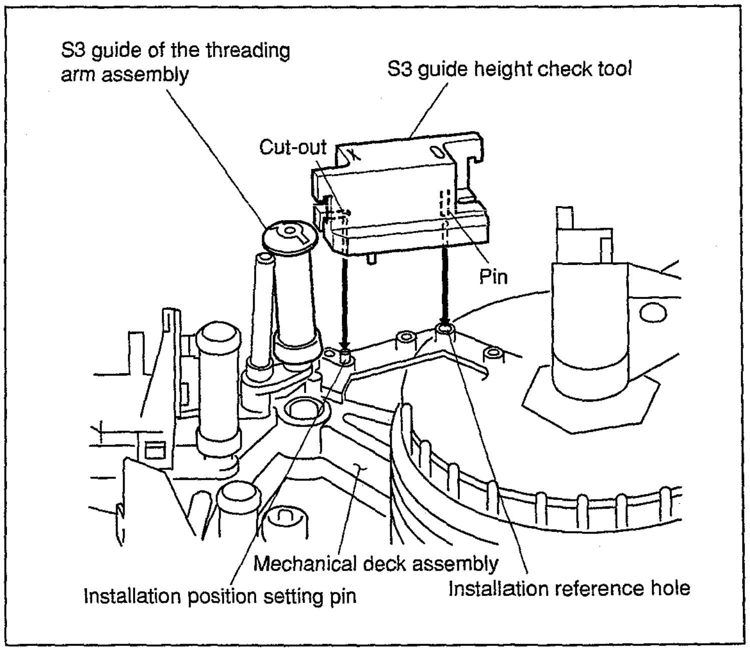
- S3 guide height check tool : J-6325-380-A
- Tape guide adjustment screwdriver : J-6325-380-A
- Mirror (small oval type) : J-6080-840-A

Adjustment Procedure

1. Remove the FE/CTL head assembly. (Refer to Section 7-12.)
2. Attach the S3 guide height check tool until the following two requirements are satisfied.
   - Align the cut-out of the S3 guide height check tool with the installation position setting pin.
   - Insert the S3 guide height check tool into the installation reference hole.

   Note

   Adjust both of the "O" side and the "X" side until the specifications are satisfied. Either side can be used for this adjustment by setting it against the S3 guide.

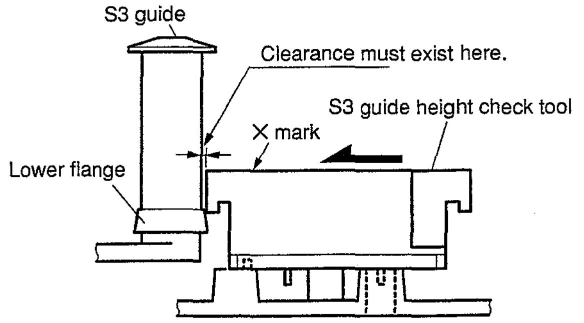

S3 guide of the threading arm assembly
S3 guide height check tool
Cut-out
Pin
Mechanical deck assembly
Installation position setting pin
Installation reference hole

3. Confirm, using a small dental mirror, that the clearance between the lower flange of the S3 guide and the S3 guide height adjustment tool satisfies the specification 1 and 2.

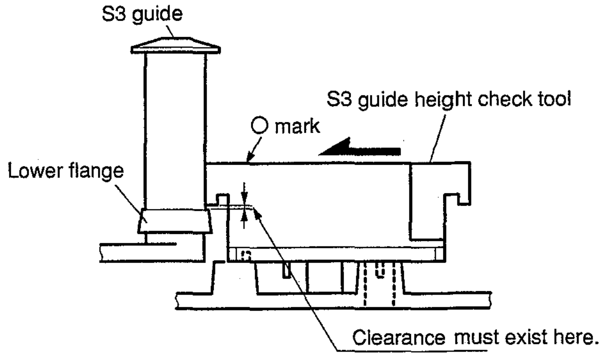
   If the specification is not satisfied, turn the S3 guide with the tape guide adjustment screwdriver to adjust height of the S3 guide.
   To lower the height : Turn clockwise.
   To raise the height : Turn counterclockwise.

   CAUTION

   When checking height of the S3 guide, never push down or push up the S3 guide.


S3 guide
Clearance must exist here.
S3 guide height check tool
X mark
Lower flange

Specification 1 :
The X mark side of the S3 guide height adjustment tool has clearance between the specified side of the S3 guide and the S3 guide height adjustment tool as shown in the illustration.


S3 guide
S3 guide height check tool
O mark
Lower flange
Clearance must exist here.

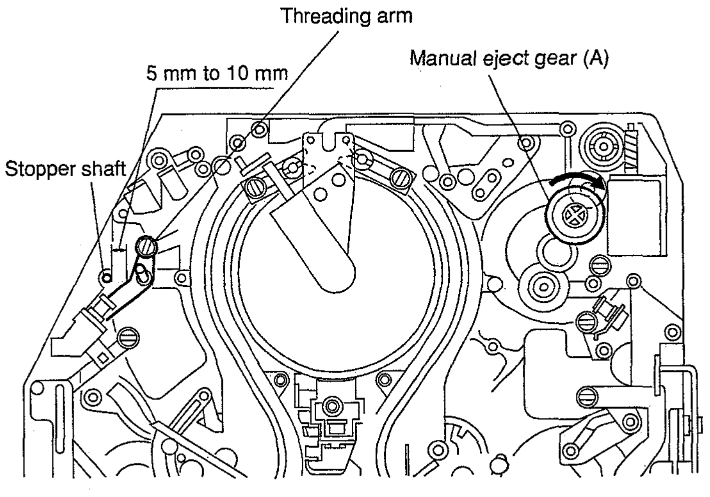
Specification 2 :
The O mark side of the S3 guide height adjustment tool has clearance between the lower flange top and the S3 guide height adjustment tool as shown in the illustration.

4. Upon completion of adjustment, remove the S3 guide height check tool.
5. Turn the manual eject gear (A) with Philips (+) head screwdriver.
6. After moving the threading arm away from the stopper shaft by 5 to 10 mm, set the machine into the threading-end state again.
7. Perform steps 1 to 3 of the adjustment procedure and confirm that the specification 1 and 2 is satisfied.

   Note

   Perform the adjustment until the specification is satisfied.

8. Reattach the FE/CTL head assembly.
   (Refer to Section 7-12.)
9. Confirm height of the CTL head.
   (Refer to Section 8-2-3.)
10. Confirm position of the CTL head.
    (Refer to Section 8-2-4.)
11. Clean the FE/CTL head assembly.
    (Refer to Section 2-1-4.)


Threading arm
5 mm to 10 mm
Manual eject gear (A)
Stopper shaft

8-1-8. Gear Chain Phase Adjustment

Note

The gear chain phase serves as the reference of the entire tape running system. When the S gear assembly and the T gear assembly are out of phase each other, the gear chain phase adjustment must be executed.

Preparations

1. Remove the front lid and outside panel assembly. (Refer to Section 1-4.)
2. Remove the cassette compartment. (Refer to Section 1-9.)

Note

When adjusting the T gear assembly, prepare the two new stop washers (3-559-408-11).

Tools

- Stop washer fastening tool : J-6323-530-A
- Parallel pin (d = 2.0 mm) : 3-703-358-04

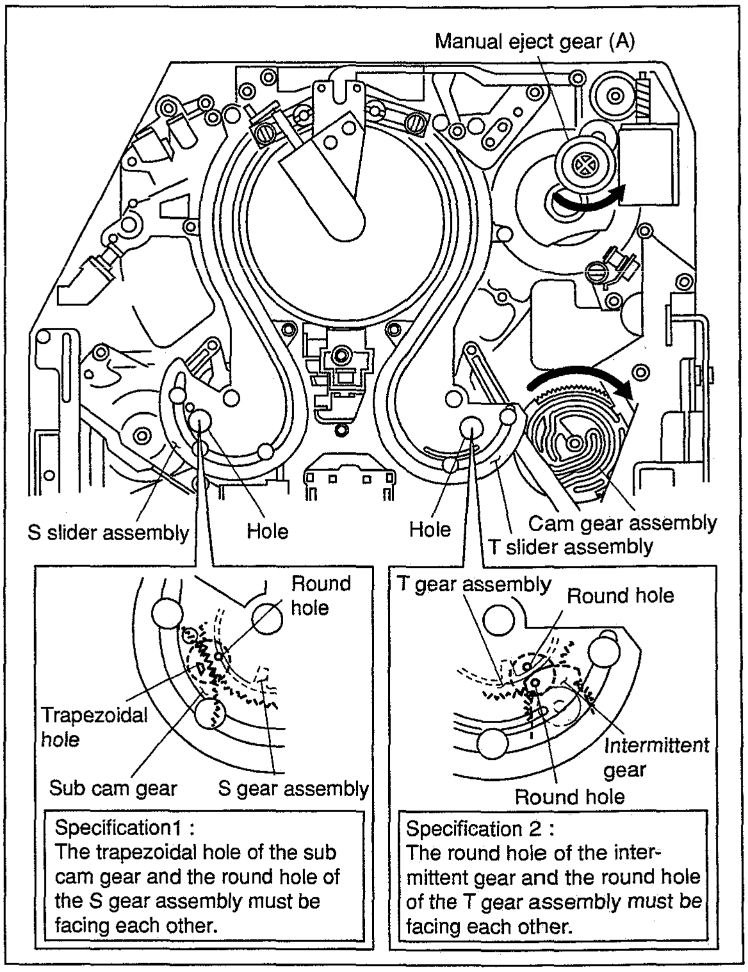
Check procedure

1. Establish the threading-end state of mechanism as follows :

- When replacing the S slider assembly :
  (1) Rotate the manual eject gear (A) counter clockwise.
  (2) Check to see that the mechanism has entered the state that is described "3. S Gear Assembly Adjustment, step (2)".
- When replacing the T slider assembly :
  (1) Rotate the manual eject gear (A) counter-clockwise.
  (2) Check to see that the mechanism has entered the state that is described "4. T Gear Assembly Adjustment, step (2)".
- When replacing the cam gear assembly :
  (1) Rotate the cam gear assembly clockwise.
  (2) Check to see that the mechanism has entered the state that is described "4. T Gear Assembly Adjustment, step (2)".

2. Confirm the gear chain phase as follows :

- When replacing the S slider assembly :
  Confirm that the specification 1 is satisfied.
  If the specification 1 is not satisfied, go to "3. S gear assembly adjustment".
- When replacing the T slider assembly or cam gear assembly :
  Confirm that the specification 2 is satisfied.
  If the specification 2 is not satisfied, go to "4. T gear assembly adjustment".



Specification1 :
The trapezoidal hole of the sub cam gear and the round hole of the S gear assembly must be facing each other.

Specification 2 :
The round hole of the intermittent gear and the round hole of the T gear assembly must be facing each other.

Adjustment Procedure

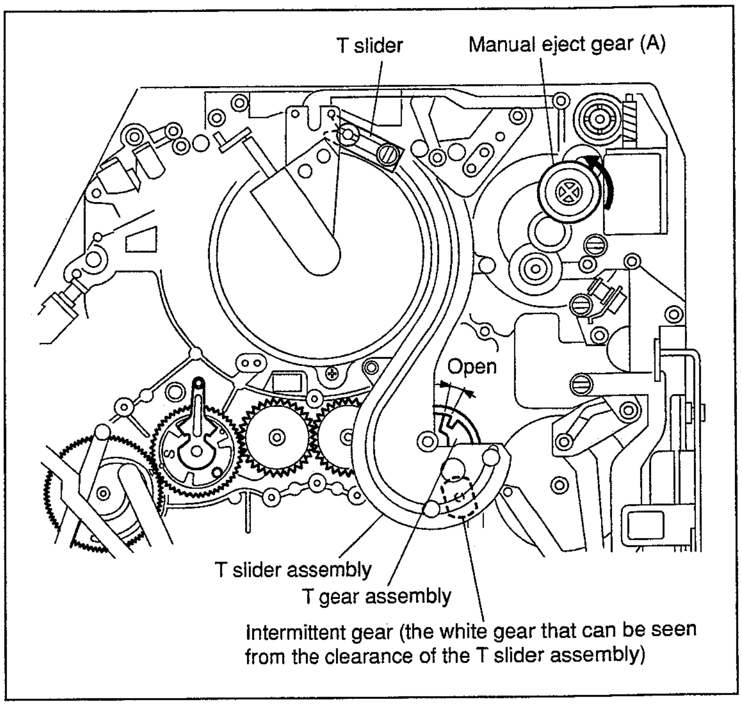
3. S gear assembly adjustment

(1) Remove the S slider assembly.
(Refer to Section 7-32.)

(2) Rotate the manual eject gear (A) counter-clockwise until the mechanism reaches the threading-end state.
(Confirm that the intermittent gear stops rotating and the specified portion of the T gear assembly shown in the illustration, has fully opened.)

CAUTION

Do not rotate the intermittent gear after the mechanism has reached the threading end state. If the intermittent gear is kept rotating, it will damage the mechanical parts.

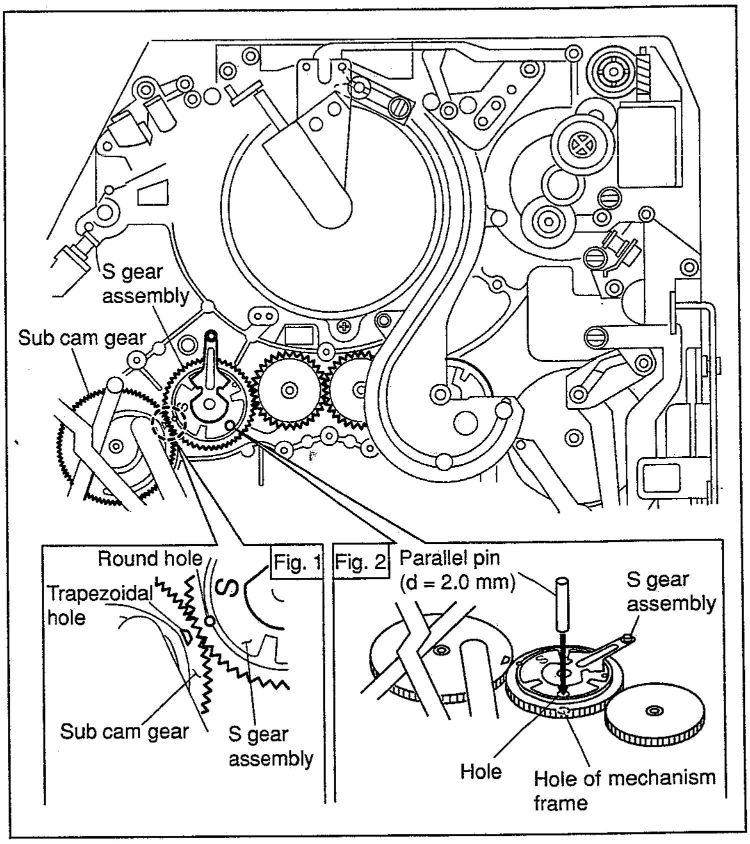

T slider
Manual eject gear (A)
Open
T slider assembly
T gear assembly
Intermittent gear (the white gear that can be seen from the clearance of the T slider assembly)

(3) To adjust coupling between the gears, slip off and on the S gear assembly until the round hole of the S gear assembly faces right opposite to the trapezoidal hole of the sub cam gear. (Fig. 1)

(4) Insert the parallel pin (d = 2.0 mm) into the hole of the S gear assembly and the hole of the mechanism frame. (Fig. 2)
Confirm that the round hole of the S gear assembly faces right opposite to the trapezoidal hole of the sub cam gear. (Fig. 1)

(5) Repeat steps (3) and (4) until the mechanism state described in step (4) is obtained.

(6) When the adjustment is complete, remove the parallel pin and attach the S slider assembly.
(Refer to Section 7-32.)


S gear assembly
Sub cam gear
Fig. 1
Round hole
Trapezoidal hole
Sub cam gear
S gear assembly
Fig. 2
Parallel pin (d = 2.0 mm)
S gear assembly
Hole
Hole of mechanism frame

4. T gear assembly adjustment

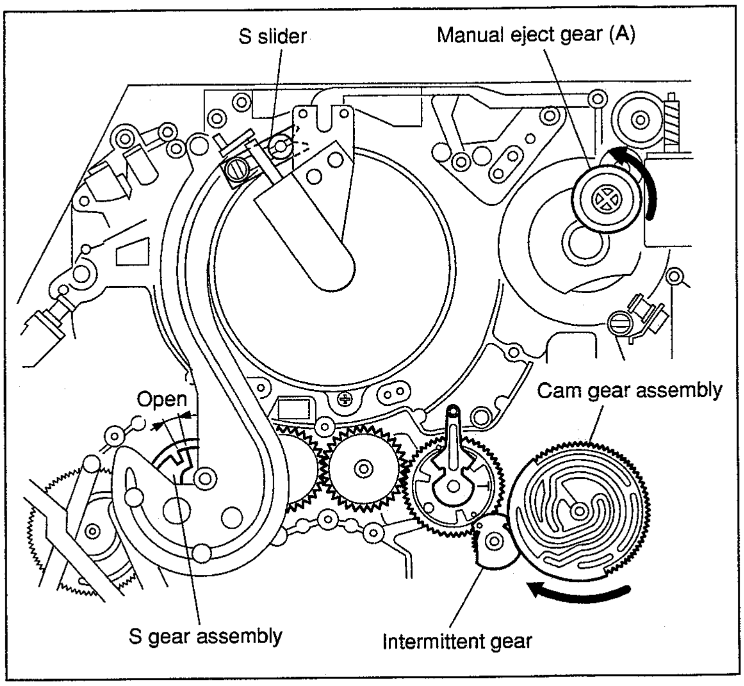
(1) Remove the T slider assembly.
(Refer to Section 7-33.).

(2) Enter the unit in the threading-end state.
(Confirm that the intermittent gear stops rotating and the specified portion of the S gear assembly shown in the illustration, has fully opened.)

- When replacing the T slider assembly : Rotate the manual eject gear (A) counter-clockwise.
- When replacing the cam gear assembly : Rotate the cam gear assembly clockwise.

CAUTION

Do not rotate the intermittent gear after the mechanism has reached the threading end state. If the intermittent gear is kept rotating, it will damage the mechanical parts.


S slider
Manual eject gear (A)
Open
Cam gear assembly
S gear assembly
Intermittent gear

(3) Fix the gear chain by inserting the parallel pin (d = 2.0 mm) from the hole of the S slider assembly through the S gear assembly's hole until it is inserted into the hole of the mechanism frame. (Fig. 1)

(4) Remove the cam gear. (Refer to Section 7-34.)

(5) Remove the stop washer and remove the intermittent gear. (Fig. 2)

(6) To adjust coupling between the gears, slip off and on the T gear assembly or intermittent gear until the round hole of the T gear assembly faces right opposite to the round hole of the intermittent gear. (Fig. 3)

(7) Attach the intermittent gear using the new stop washer.

(8) Attach the cam gear assembly using the new stop washer. (Refer to Section 7-34.)

(9) When the adjustment is complete, remove the parallel pin and attach the T slider assembly. (Refer to Section 7-33.)

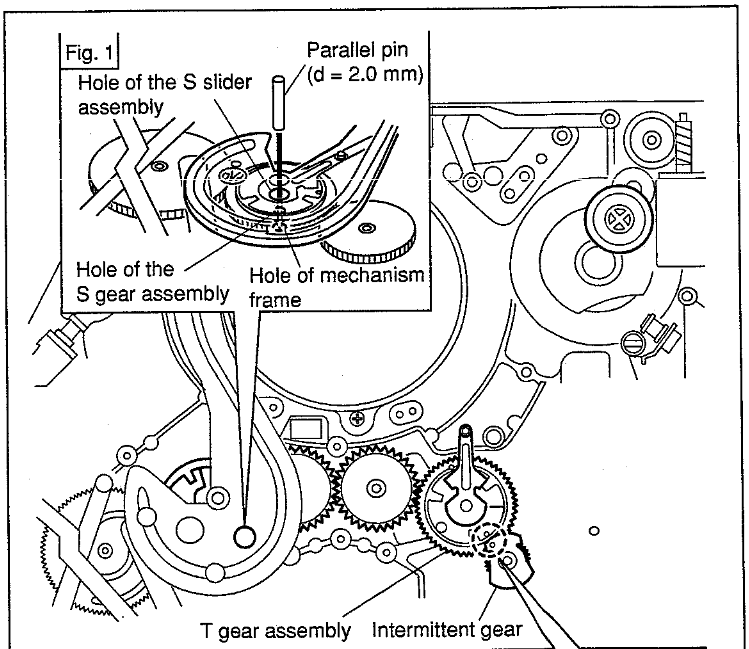


Fig. 1
Hole of the S slider assembly
Parallel pin (d = 2.0 mm)
Hole of the S gear assembly
Hole of mechanism frame
T gear assembly
Intermittent gear

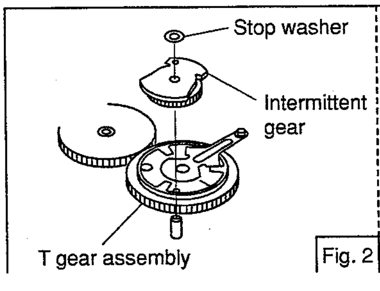


Fig. 2
Stop washer
Intermittent gear
T gear assembly

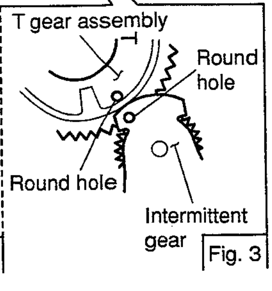


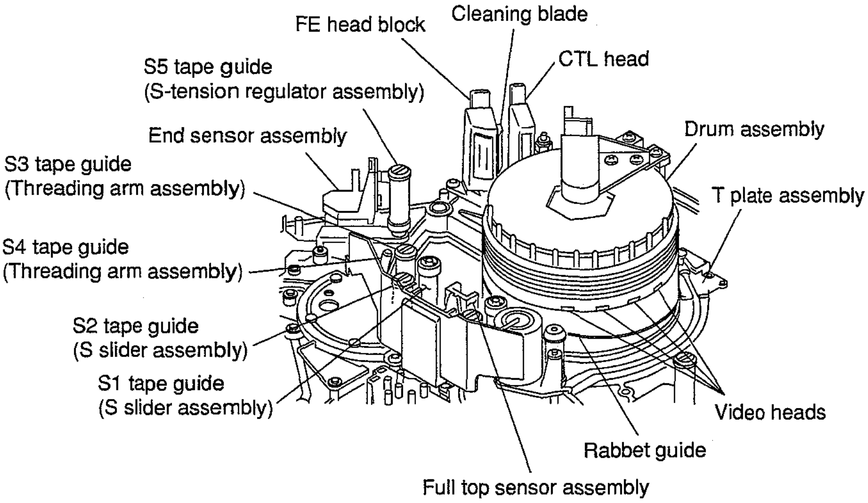
Fig. 3
T gear assembly
Round hole
Round hole
Intermittent gear

8-2. Tape Run System Adjustment

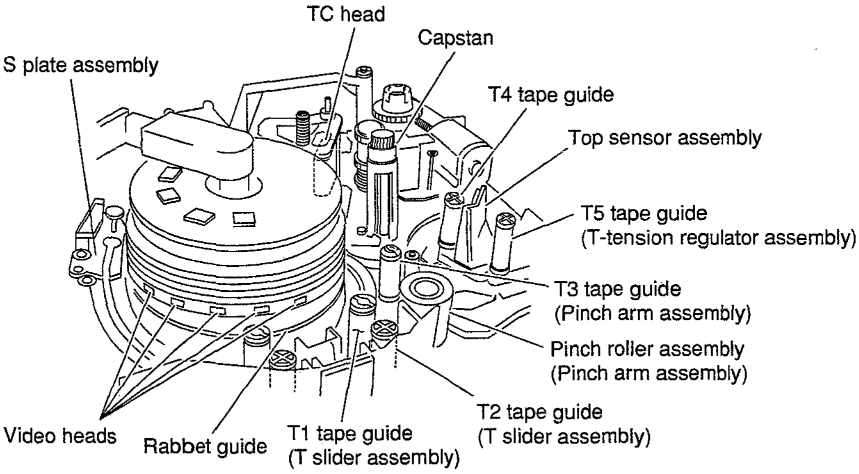
Index

1. Identifying the parts of the tape run system

Drum entrance side (Unthreaded end state)


FE head block
Cleaning blade
CTL head
S5 tape guide
(S-tension regulator assembly)
End sensor assembly
Drum assembly
S3 tape guide
(Threading arm assembly)
T plate assembly
S4 tape guide
(Threading arm assembly)
S2 tape guide
(S slider assembly)
S1 tape guide
(S slider assembly)
Video heads
Rabbet guide
Full top sensor assembly

Drum exit side (Unthreaded end state)


TC head
Capstan
S plate assembly
T4 tape guide
Top sensor assembly
T5 tape guide
(T-tension regulator assembly)
T3 tape guide
(Pinch arm assembly)
Pinch roller assembly
(Pinch arm assembly)
T2 tape guide
(T slider assembly)
Video heads
Rabbet guide
T1 tape guide
(T slider assembly)

2. Note

Perform the tape run system adjustment with the cassette compartment installed in the unit.

3. Preparations

(1) Turn the POWER switch to OFF.
(2) Remove the front lid and the outside panel assembly. (Refer to Section 1-4.)
(3) Clean the following portions with a cleaning cloth moistened with cleaning fluid. (Refer to Sections 2-1-2, 2-1-3, 2-1-4, 2-1-5, 7-7 and 7-37.)
    - Video heads
    - Upper drum tape running surface
    - Lower drum tape running surface and rabbet guide
    - Stationary heads
    - Cleaning blade
    - All tape guides
    - Capstan shaft
    - Pinch roller
    - S/T plate assembly
    - S/T slider foot assembly

4. Tools/measuring equipment

- Screwdriver (tool) TG adjustment (45) : J-6322-420-B
- Tool, 0.89 bit (for repairing) (45) : J-6322-420-3
- Hexagon bit (for torque screwdriver) (S : 1.5) : J-6326-120-A
- HN-255 assembly : A-8315-553-A
- Mirror (small oval type) : J-6080-840-A
- Cleaning cloth : 3-184-527-01
- Cleaning fluid : 9-919-573-01
- Blank tape (BCT-60MX) : Commercially available on market
- Oscilloscope
- Locking compound (1401B) : 7-432-114-11
- Skewer
- Alignment tape MR2-1P : 8-960-077-61

  Contents of recording (MR2-1P : For MPEG IMX)

Time (min. : sec.)	Digital video/Digital audio	CTL track
00:00 - (Pulse*)	8T (2.9 MHz) (AC CH)	CTL
15:00 -	8T (2.9 MHz) (B/D CH)	CTL
20:00 - 25:00	2T (11.4 MHz) (All CH)	CTL

* : The time code data is not recorded on the time code track during pulse portion (00:00 to 15:00). This portion is recorded the duty 7:3 pulse on the CTL track. Therefore, when playing back this portion, time data which is interpolated by the time code signal is displayed.

8-2-1. Tape Run Adjustment

Perform the tape run adjustment only when the S1 tape guide or T1 tape guide or T3 tape guide or other tape guide assemblies (S2 to S5, T2, T5) is replaced or when the parts such as stationary head in the tape run system are replaced.

Notes

- When the tape run adjustment is going to be started after parts of the tape run system are replaced, check first the tape running status and adjust its system using a cassette tape BCT-60MX that is commercially available, to confirm that a tape can run safe without damage.
  If a tape that does not have the CTL signal recording yet, is used, there can be a case that the tension regulator oscillates in the PLAY mode that makes the check and adjustment works difficult. In such a case, use of a tape that has the CTL signal recording, is recommended.
  Upon completion of the above check and adjustment, start the tape run check and fine adjustment using the alignment tape MR2-1P.
- In the following check and adjustment procedures, all procedures are premised on the use of the alignment tape unless specific cassette tape is specified.
- Tighten the set screw on top of tape guide with the following tightening torque.
  10×10^{-2} N•m (1.0 kgf•cm)
- When the adjustment is attempted, be sure to check the video tracking.
  Upon completion of the video tracking check, apply the locking compound on the set screw on top of tape guide.

Tools

• Screwdriver (Tool) TG adjustment (45) :	J-6322-420-B
• Tool, 0.89 bit (for repairing) (45) :	J-6322-420-3
• Mirror (small oval type) :	J-6080-840-A
• Alignment tape MR2-1P :	8-960-077-61
• Cassette tape BCT-60MX :	Commercially available on market
• Locking compound :	7-432-114-11

Preparations

1. Turn the POWER switch to OFF.
2. Remove the front lid and outside panel assembly. (Refer to Section 1-4.)
3. Turn the POWER switch to ON.

Drum entrance side

Check Procedure

1. PLAY state (tape top portion)

Enter the PLAY state using a tape top (from 01 : 00 to 10 : 00) of the cassette tape BCT-60MX.
Check to see that tape runs while satisfying the specification 1.
If the specification 1 is not satisfied, perform step 7 and higher.

2. F FWD state (tape top portion)

Enter the F FWD state using a tape top (from 01 : 00 to 10 : 00) of the cassette tape BCT-60MX.
Check to see that tape runs while satisfying the specification 1.
If the specification 1 is not satisfied, perform step 7 and higher.

3. REW state (tape top portion)

Enter the REW state using a tape top (from 01 : 00 to 10 : 00) of the cassette tape BCT-60MX.
Check to see that tape runs while satisfying the specification 1.
If the specification 1 is not satisfied, perform step 7 and higher.

4. PLAY state (tape end portion)

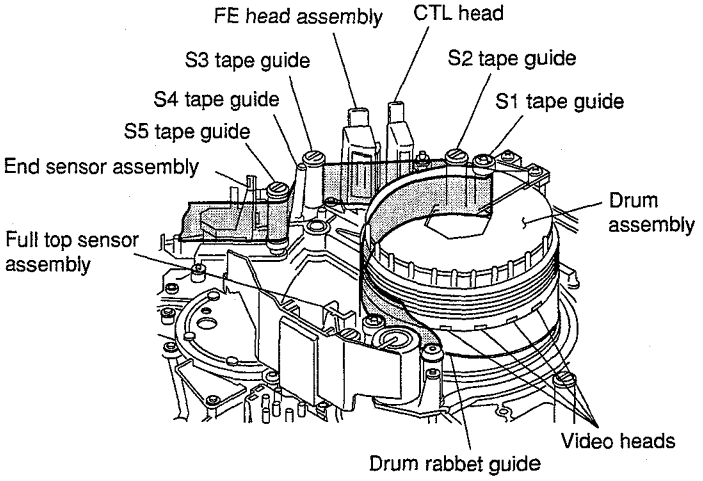
Enter the PLAY state using a tape end (for NTSC : from 50 : 00 to 60 : 00, for PAL : from 61 : 00 to 71 : 00) of the cassette tape BCT-60MX.
Check to see that tape runs while satisfying the specification 1.
If the specification 1 is not satisfied, perform step 7 and higher.

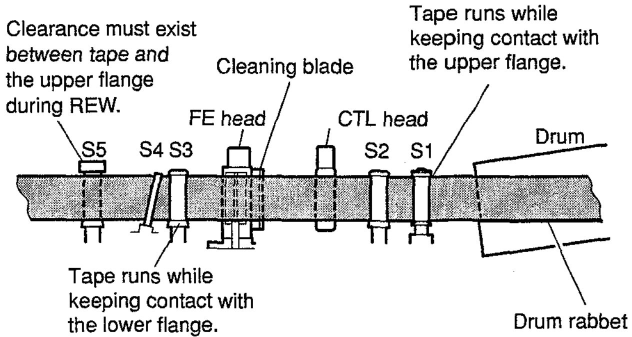
5. F FWD state (tape end portion)

Enter the F FWD state using a tape end (for NTSC : from 50 : 00 to 60 : 00, for PAL : from 61 : 00 to 71 : 00) of the cassette tape BCT-60MX.
Check to see that tape runs while satisfying the specification 1.
If the specification 1 is not satisfied, perform step 7 and higher.

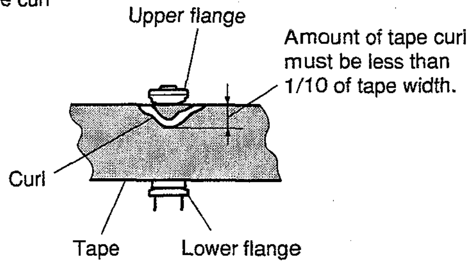
6. REW state (tape end portion)

Enter the REW state using a tape end (for NTSC : from 50 : 00 to 60 : 00, for PAL : from 61 : 00 to 71 : 00) of the cassette tape BCT-60MX.
Check to see that tape runs while satisfying the specification 1.
If the specification 1 is not satisfied, perform step 7 and higher.


FE head assembly
CTL head
S3 tape guide
S2 tape guide
S4 tape guide
S1 tape guide
S5 tape guide
End sensor assembly
Drum assembly
Full top sensor assembly
Video heads
Drum rabbet guide


Clearance must exist between tape and the upper flange during REW.
Cleaning blade
Tape runs while keeping contact with the upper flange.
FE head
CTL head
Drum
S5
S4 S3
S2
S1
Tape runs while keeping contact with the lower flange.
Drum rabbet guide

• Allowance of tape curl


Upper flange
Amount of tape curl must be less than 1/10 of tape width.
Curl
Tape
Lower flange

Specifications 1 :
(A) S5 tape guide
Tape curl must not exist either upper flange and lower flange.
Clearance must exist between tape and the upper flange during REW.
(B) S3 tape guide
Amount of tape curl at the upper or lower flange must be smaller than the allowable limits.
Amount of tape curl must be less than 1/10 of tape width.
If it is 1/10 or more, check that there is no damage after 10 passes of FF → REW.
(C) S2 tape guide
Amount of tape curl at the upper or lower flange must be smaller than the allowable limits.
Amount of tape curl must be less than 1/10 of tape width.
(D) S1 tape guide
Tape runs while keeping contact with the upper flange.
Amount of tape curl at the upper or lower flange must be smaller than the allowable limits.
Amount of tape curl must be less than 1/10 of tape width.
(E) Drum rabbet guide
Tape runs while keeping contact with the drum rabbet guide and must not have any curl.

Adjustment Procedure

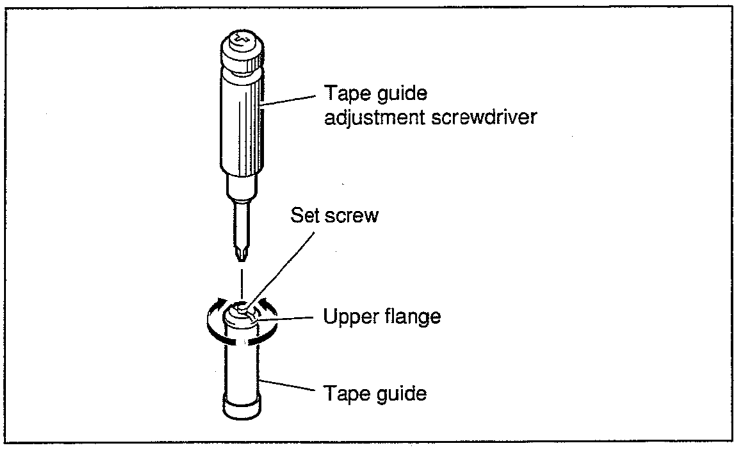
7. Tape guide height adjustment

(1) Enter the PLAY state using the cassette tape BCT-60MX.

(2) Loosen the set screw on top of the guide with the screwdriver (tool) TG adjustment, rotate the upper flange until the specification 1 is satisfied.

Note

Do not rotate the upper flange clockwise during the S3 tape guide height adjustment. Only when the threading arm is replaced, make adjustment for the S3 tape guide height by rotating the upper flange clockwise in the range of 1/2 turn.



(3) Tighten the set screw on top of the guide
Standard tightening torque :
10×10^{-2} N•m (1.0 kgf•cm)

Note

The tape guides S2, S3 and S5 do not have the set screw on the tape guides. Adjust height by rotating the upper flange.

8. Tape running recheck at drum entrance side

Perform steps 1 to 6 of the check procedure and recheck that the specification is satisfied.
If the specification is not still satisfied, perform step 7 again.

9. Tape running check at drum exit side

Check the tape running at the drum exit side as described on the following pages.

When the Adjustment is Performed

10. Video tracking check

(Refer to Section 8-2-2.)

11. CTL head height check

(Refer to Section 8-2-3.)

12. CTL head position check

(Refer to Section 8-2-4.)

13. TC head position check

(Refer to Section 8-2-6.)

Drum exit side

Check Procedure

1. PLAY state (tape top portion)

Enter the PLAY state using a tape top (from 01 : 00 to 10 : 00) of the cassette tape BCT-60MX.
Check to see that tape runs while satisfying the specification 2.
If the specification 2 is not satisfied, perform step 8 and higher.

2. F FWD state (tape top portion)

Enter the F FWD state using a tape top (from 01 : 00 to 10 : 00) of the cassette tape BCT-60MX.
Check to see that tape runs while satisfying the specification 2.
If the specification 2 is not satisfied, perform step 8 to 15.

3. REW state (tape top portion)

Enter the REW state using a tape top (from 01 : 00 to 10 : 00) of the cassette tape BCT-60MX.
Check to see that tape runs while satisfying the specification 2.
If the specification 2 is not satisfied, perform step 8 to 15.

4. PLAY state (tape end portion)

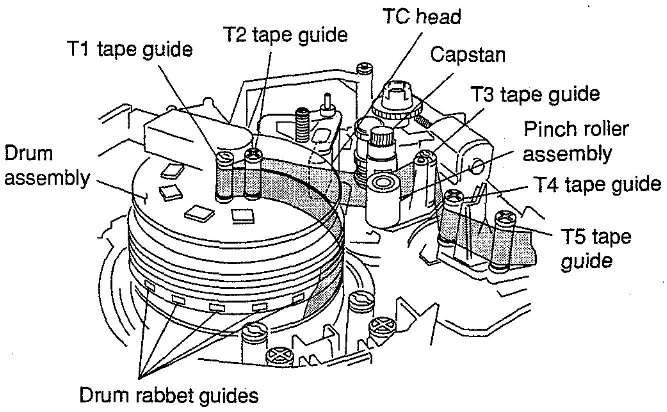
Enter the PLAY state using a tape end (for NTSC : from 50 : 00 to 60 : 00, for PAL : from 61 : 00 to 71 : 00) of the cassette tape BCT-60MX.
Check to see that tape runs while satisfying the specification 2.
If the specification 2 is not satisfied, perform step 8 to 15.

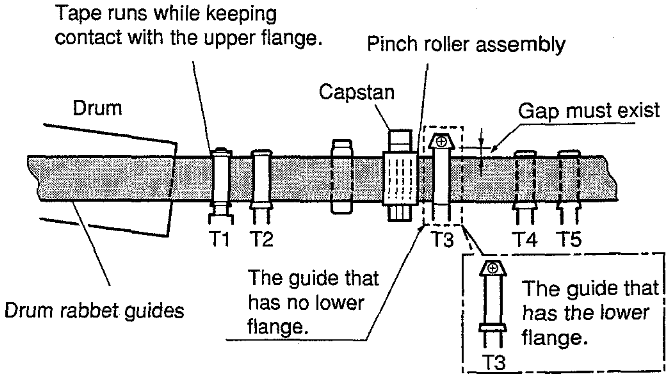
5. F FWD state (tape end portion)

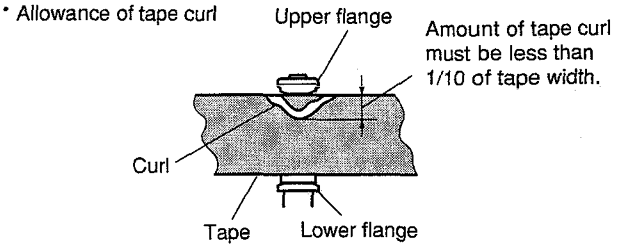
Enter the F FWD state using a tape end (for NTSC : from 50 : 00 to 60 : 00, for PAL : from 61 : 00 to 71 : 00) of the cassette tape BCT-60MX.
Check to see that tape runs while satisfying the specification 2.
If the specification 2 is not satisfied, perform step 8 to 15.

6. REW state (tape end portion)

Enter the REW state using a tape end (for NTSC : from 50 : 00 to 60 : 00, for PAL : from 61 : 00 to 71 : 00) of the cassette tape BCT-60MX.
Check to see that tape runs while satisfying the specification 2.
If the specification 2 is not satisfied, perform step 8 to 15.


TC head
T2 tape guide
T1 tape guide
Capstan
T3 tape guide
Pinch roller assembly
Drum assembly
T4 tape guide
T5 tape guide
Drum rabbet guides


Tape runs while keeping contact with the upper flange.
Pinch roller assembly
Capstan
Drum
Gap must exist
T1
T2
T3
T4
T5
Drum rabbet guides
The guide that has no lower flange.
The guide that has the lower flange.
T3


• Allowance of tape curl
Upper flange
Amount of tape curl must be less than 1/10 of tape width.
Curl
Tape
Lower flange

Specification 2 :
(A) T3 tape guide
The guide that has no lower flange. : Gap must exist in between the upper flange and the tape guide.
The guide that has the lower flange. : Amount of tape curl at the upper or lower flange must be smaller than the allowable limits. Amount of tape curl must be less than 1/10 of tape width.
(B) T2 tape guide
Amount of tape curl at the upper or lower flange must be smaller than the allowable limits.
Amount of tape curl must be less than 1/10 of tape width.
(C) T1 tape guide
Tape runs while keeping contact with the upper flange.
Amount of tape curl at the upper flange must be smaller than the allowable limits.
Amount of tape curl must be less than 1/10 of tape width.
(D) Drum rabbet guide
Tape runs while keeping contact with the drum rabbet guide and must not have any curl.

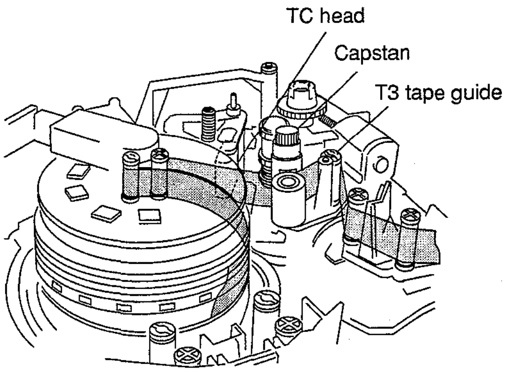
7. Tape run check at around the capstan shaft

(1) Enter the REW state using a tape top (from 01 : 00 to 05 : 00) of the cassette tape BCT-60MX for a few seconds then switch the mode from REW to PLAY state.
When the mode is switched, check to see that tape running must satisfy the specification 3 in the followings.
- Between the TC head and capstan shaft.
- Between the T3 tape guide and capstan shaft.

Repeat the above operation a few times and then confirm that the specification 3 is satisfied.If the specification 3 is not satisfied, perform step 8 to 15.

Note

The procedure of adjustment is different depending on the shape of the T3 tape guide.



Specification 3 :
Tape must not be damaged such as wrinkled due to uneven pressure of pinch roller against capstan. At the same time, there must not exist uneven tension in vertical (up/down) direction of tape between the TC head and capstan shaft, and between the capstan shaft and the T3 tape guide.

(2) Repeat the following switching of modes a few times.
- Enter the F FWD state and then switch the mode to the PLAY state in a few seconds.
- Enter the REV × 1 state and then switch the mode to the PLAY state in a few seconds.

At the time, check to see that tape running must satisfy the specification 3 in the followings.
- Between the TC head and capstan shaft.
- Between the T3 tape guide and capstan shaft.

If the specification 3 is not satisfied, perform step 8 to 15.

Note

The procedure of adjustment is different depending on the shape of the T3 tape guide.

How to enter the REV × 1 mode

(1) Set the × 1 REV SEARCH to ON using the VTR maintenance menu, A40 : PATH MODE SEL.
(2) After pressing the PLAY button, press the REW button. (Both the PLAY and REW buttons on the keyboard turn on.)

Adjustment Procedure

8. Tape guide height adjustment

Notes

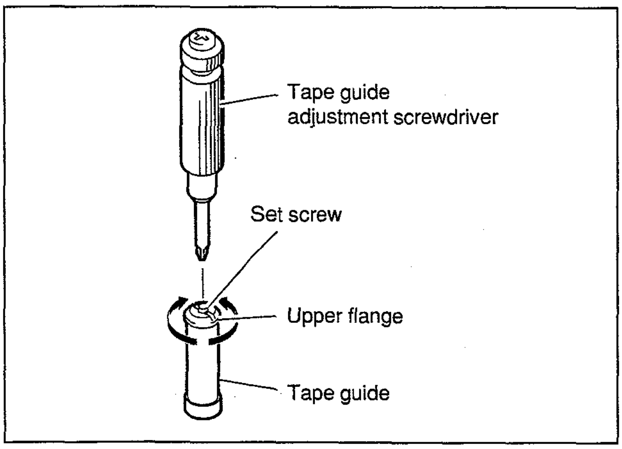
- When the T3 tape guide has no lower flange, perform the " A (When the T3 tape guide has no lower flange)"
- When the T3 tape guide has the lower flange, perform the " B (When the T3 tape guide has the lower flange)"

A (When the T3 tape guide has no lower flange)

(1) Enter the PLAY state using the cassette tape BCT-60MX.
(2) Loosen the set screw on top of the T3 tape guide with the screwdriver (tool) TG adjustment, rotate the flange from the position in which the upper flange contacts with the tape, by 1/4 turn in order to create a gap between the upper flange and the tape.
(3) Tighten the set screw on top of the guide.
Standard tightening torque :
10×10^{-2} N•m (1.0 kgf•cm)

Notes

- The tape guide T4 is fixed and cannot be adjusted. Do not rotate the upper flange excessively.
- The tape guides T2 and T5 do not have the set screw on the tape guides. Adjust height by rotating the upper flange.



(4) Check the tape running between the capstan shaft and the T3 tape guide. The tape running must satisfy the following conditions.
- Tape must run in the state that the tape surface runs flat as if it is a flat surface of a mirror.
- If tape speed deviation exists in the upper or lower portion of a tape, the tape surface will be distorted. The tape speed deviation must not exist.

Note

If the conditions mentioned in (4) are not satisfied, adjust the T5 tape guide height.

- When tape tension is small at the upper portion of a tape :
  Move down the T5 tape guide.
- When tape tension is small at the lower portion of a tape :
  Raise the T5 tape guide.

Note that the maximum allowable range of rotation of the T5 tape guide is within one rotation when adjusting the T5 tape guide height.

B (When the T3 tape guide has the lower flange)

(1) Enter the PLAY state using the cassette tape BCT-60MX.
(2) Loosen the set screw on top of the guide with the screwdriver (tool) TG adjustment, rotate the upper flange until the specification 3 is satisfied.
(3) Tighten the set screw on top of the guide
Standard tightening torque :
10×10^{-2} N•m (1.0 kgf•cm)

9. Tape running recheck at drum exit side

Perform steps 1 to 7 of the check procedure and recheck that the specification is satisfied.
If the specification is not still satisfied, perform step 8 again.

10. Tape running recheck at drum entrance Side

Recheck the tape running at the drum entrance side as described on the former pages.

When the Adjustment is Performed

11. Video tracking check

(Refer to Section 8-2-2.)

12. TC head height check

(Refer to Section 8-2-5.)

13. CTL head position check

(Refer to Section 8-2-4.)

14. TC head position check

(Refer to Section 8-2-6.)

15. TC output level check

(Refer to Section 8-2-7 "1".)

8-2-2. Video Tracking Adjustment

Notes

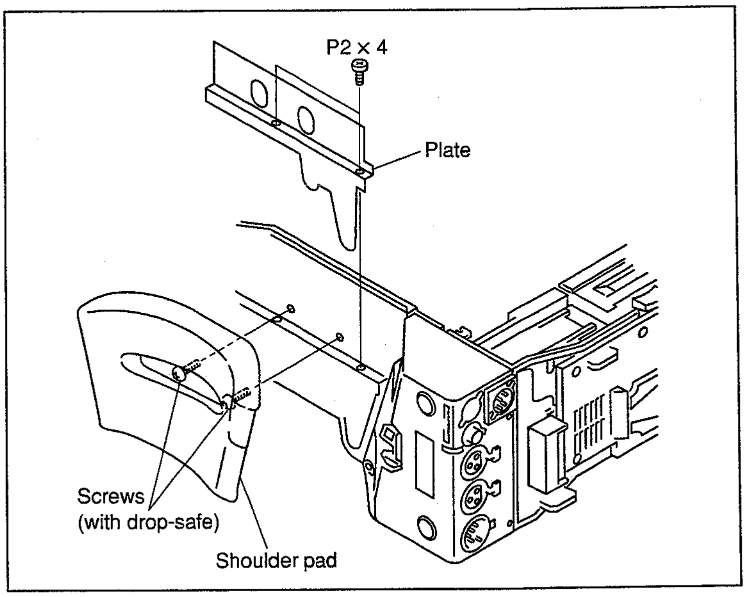
- Tighten the set screw on top of tape guide with the following tightening torque. 10×10^{-2} N•m (1.0 kgf•cm)
- When the video tracking is adjusted, be sure to check the tape running state. Upon completion of the video tracking check, apply the locking compound on the set screw on top of tape guide.

Tools

• Screwdriver (tool) TG adjustment (45) :	J-6322-420-B
• HN-255 assembly :	A-8315-553-A
• Mirror (small oval type) :	J-6080-840-A
• Alignment tape MR2-1P :	8-960-077-61

Preparations

1. Turn the POWER switch to OFF.
2. Remove the front lid and the outside panel assembly. (Refer to Section 1-4.)
3. Loosen the two screws (with drop-safe) and remove the shoulder pad.
4. Remove the two screws (P2 × 4) and remove the plate.
5. Connect the HN-255 assembly to the MDC-13A board.
   5-pin connector on the HN-255 assembly : CN902/MDC-13A board
   8-pin connector on the HN-255 assembly : CN903/MDC-13A board
6. Connect an oscilloscope.
   CH-1 : REC A PB/Circuit board on the HN-255 assembly
   TRIG : SERVO CF/Circuit board on the HN-255 assembly
7. Turn on the main power.
8. Enter the REC-head playback mode using the maintenance menu.
9. Insert the alignment tape MR2-1P.



Check Procedure

1. Video tracking check

(1) Set the switch S402/MDC-13A board (side B) to ON.
Then D404 turns on and operation of the TRACKING control knob is enabled.

(2) Play back the alignment tape MR2-1P (from 01 : 00 to 15 : 00).

(3) Check that the amplitude at the entrance and exit does not become greater than the amplitude at the center of envelope waveform when the TRACKING control (RV401)/ MDC-13A board is rotated.
The amplitude at the entrance and exit become greater than the amplitude at the center, perform the adjustment (drum entrance side or drum exit side) of step 5 and higher.

(4) Rotate the TRACKING control so that the RF envelope waveform is reduced to about 80% of the maximum amplitude. Check at this time that the RF waveform meets the specifications 1 to 3. If it does not meet the specifications of 1 to 3, perform the adjustment (drum entrance side or drum exit side) of step 3 and higher.

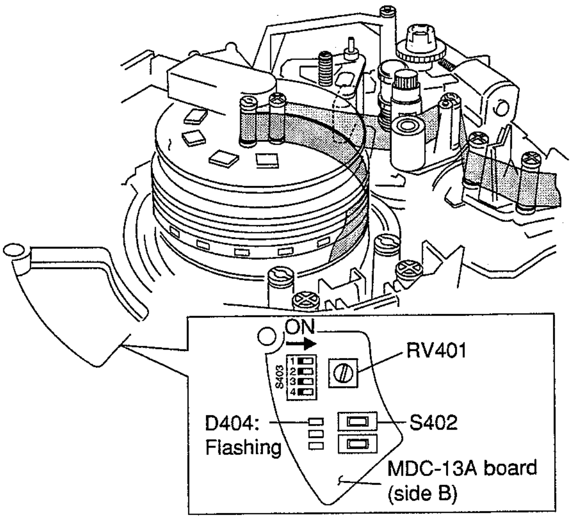
2. Video tracking check at the respective modes

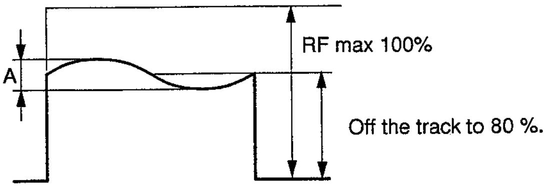
(1) Raise the unit from the horizontal posture to the upright posture. Check that the RF waveform meets the specifications 1 to 3 when the unit is raised from the horizontal posture to the upright posture.
If it does not meet the specifications of 1 to 3, perform the adjustment (drum entrance side or drum exit side) of step 3 and higher.

(2) Return the unit to the horizontal posture. Repeat switching of mode from EJECT state to the PLAY state a few times. Check that the RF waveform remains unchanged from the amplitude in the PLAY state and also it meets the specifications 1 to 3 when the unit is returned from upright to horizontal posture. If the RF waveform changes or it does not meet the specifications of 1 to 3, perform the adjustment (drum entrance side or drum exit side) of step 3 and higher.

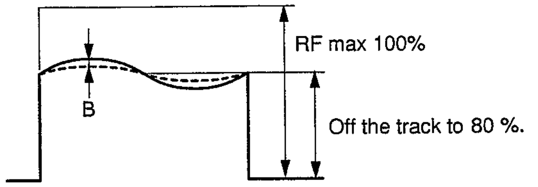
(3) Repeat the following switching of modes a few times and then confirm that the specifications 1 to 3 are satisfied.
- Mode is switched from the REV × 3 state to the PLAY state.
- Mode is switched from the STOP state to the PLAY state.

If the RF waveform changes or it does not meet the specifications of 1 to 3, perform the adjustment (drum entrance side or drum exit side) of step 3 and higher.





Specification 1 :
Amplitude fluctuation of the entire waveform must be 20% or less when the maximum amplitude of the RF waveform is taken as 100%.
A ≦ 20% (RF max = 100%)



Specification 2 :
Amplitude fluctuation of each portion of the RF waveform must be 10% or less when the maximum amplitude of the RF waveform is taken as 100%.
B ≦ 10% (RF max = 100%)

Specification 3 :
Tape must run while keeping contact with the upper flange of the S1 and T1 tape guides.
Amount of tape curl must be less than 1/10 of tape width.

How to enter the REV × 3 mode

After pressing the PLAY button, press the REW button.
(Both the PLAY and REW buttons on the keyboard turn on.)

Adjustment Procedure

Drum entrance side

3. Tracking adjustment at drum entrance side

(1) Set the switch S402/MDC-13A board (side B) to OFF.

(2) Play back MR2-1P (from 01 : 00 to 15 : 00).

(3) Loosen the set screw on top of the S1 guide with the screwdriver (tool) TG adjustment.

(4) Rotate the upper flange of the S1 guide using the screwdriver (tool) TG adjustment until the 1 to 2 peaks are created in the RF waveform as shown.
Check the followings at this time.
- There does not exist clearance between the upper flange of the S1 guide and the tape edge.
- There exists clearance between the upper flange of the S2 guide and lower edge of tape.

(5) Rotate the upper flange of the S1 guide clockwise until the RF waveform becomes almost flat.

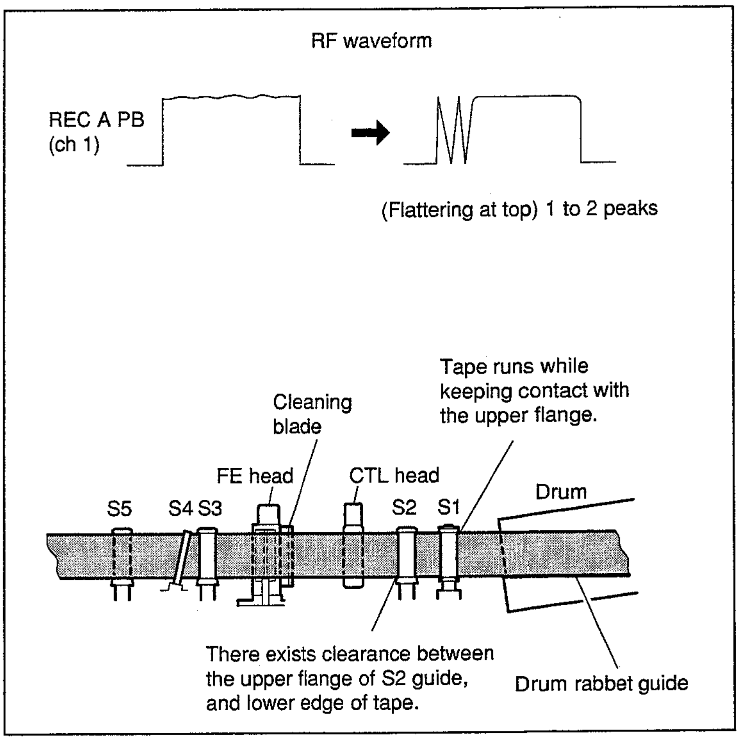
(6) Set the switch S402/MDC-13A board to ON. Then D404 turns on and operation of the TRACKING control knob is enabled.

(7) Play back MR2-1P (from 01 : 00 to 15 : 00).

(8) Rotate the TRACKING control (RV401) so that the center of the RF waveform is reduced to about 80% of the maximum amplitude.

(9) Rotate the upper flange of the S1 guide for fine adjustment until the specifications 1 to 3 are satisfied.

(10) Tighten the set screw on top of the S1 guide.
Standard tightening torque :
10×10^{-2} N•m (1.0 kgf•cm)


RF waveform
REC A PB
(ch 1)
(Flattering at top) 1 to 2 peaks
Cleaning blade
Tape runs while keeping contact with the upper flange.
FE head
CTL head
Drum
S5
S4 S3
S2
S1
There exists clearance between the upper flange of S2 guide, and lower edge of tape.
Drum rabbet guide

4. Video tracking recheck

Recheck the video tracking by performing steps 1 and 2 of the check procedure.

5. Tape run check

Check the tape running status (drum entrance side) following Section 8-2-1.

Drum exit side

6. Tracking adjustment at drum exit side

(1) Play back MR2-1P (from 01 : 00 to 15 : 00).

(2) Loosen the set screw on top of the T1 guide with the screwdriver (tool) TG adjustment.

(3) Rotate the upper flange of the T1 guide counter-clockwise using the screwdriver (tool) TG adjustment until the 1 to 2 peaks are created in the RF waveform as shown.
Check the followings at this time.
- There does not exist clearance between the upper flange of the T1 guide and the top edge of tape.
- There exists clearance between the lower flange of the T2 guide and lower edge of tape.

(4) Rotate the upper flange of the T1 guide clockwise until the RF waveform becomes almost flat.

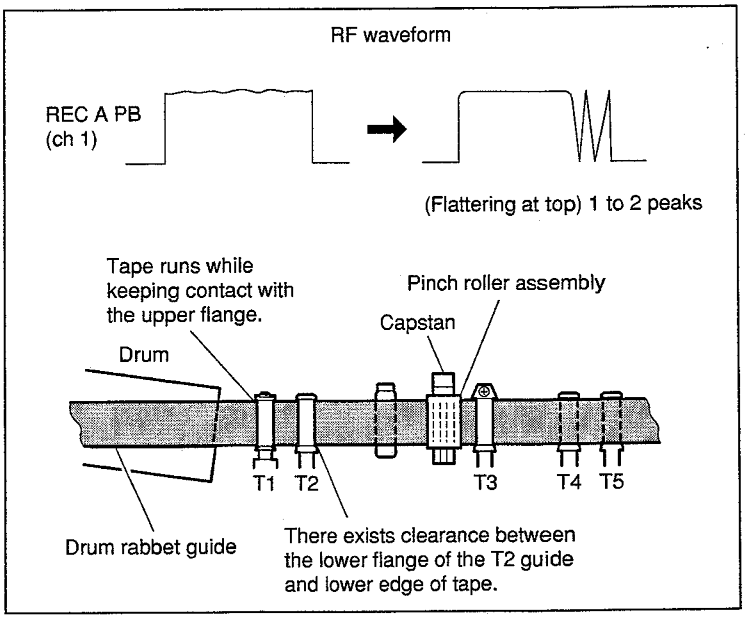
(5) Set the switch S402/MDC-13A board (side B) to ON.
Then D404 turns on and operation of the TRACKING control knob is enabled.

(6) Play back MR2-1P (from 01 : 00 to 15 : 00).

(7) Rotate the TRACKING control (RV401) so that the center of the RF waveform is reduced to about 80% of the maximum amplitude.

(8) Rotate the upper flange of the T1 guide for fine adjustment until the specifications 1 to 3 are satisfied.

(9) Tighten the set screw on top of the T1 guide.
Standard tightening torque :
10×10^{-2} N•m (1.0 kgf•cm)


RF waveform
REC A PB
(ch 1)
(Flattering at top) 1 to 2 peaks
Tape runs while keeping contact with the upper flange.
Pinch roller assembly
Capstan
Drum
T1
T2
T3
T4
T5
Drum rabbet guide
There exists clearance between the lower flange of the T2 guide and lower edge of tape.

7. Video Tracking Recheck

Recheck the video tracking by performing steps 1 and 2 of the check procedure.

8. Tape Run Check

Check the tape running status (at drum exit side) referring to Section 8-2-1.

When the Adjustment is Performed

9. CTL head height check

(Refer to Section 8-2-3.)

10. CTL head position check

(Refer to Section 8-2-4.)

11. TC head position check

(Refer to Section 8-2-6.)

12. TC head height check

(Refer to Section 8-2-5.)

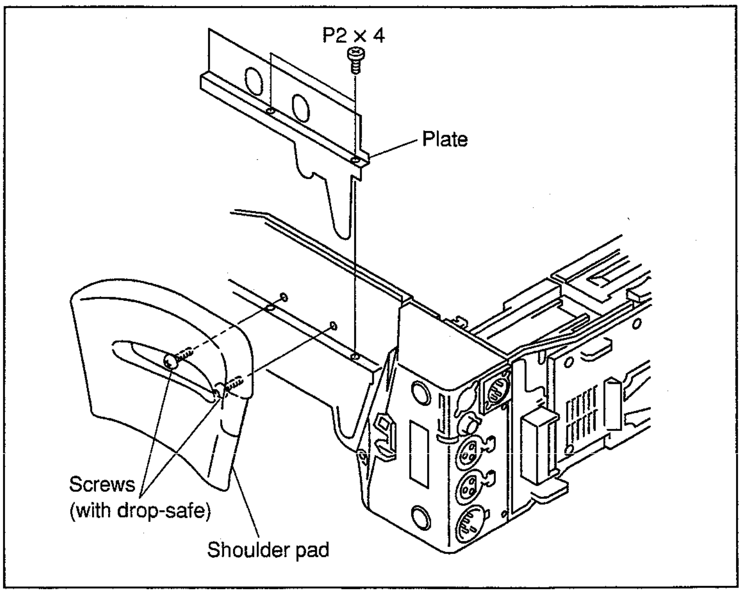
8-2-3. CTL Head Height Adjustment

Tools

• HN-255 assembly :	A-8315-553-A
• Alignment tape MR2-1P :	8-860-077-61
• Nut driver (for across : 4.5 mm) :	7-700-751-01
• Oscilloscope	
• Skewer	

Preparations

1. Turn the POWER switch to OFF.
2. Remove the front lid and the outside panel assembly. (Refer to Section 1-4.)
3. Remove the shoulder pad and the plate.
4. Connect the HN-255 assembly to the MDC-13A board.
   5-pin connector on the HN-255 assembly : CN902/MDC-13A board
   8-pin connector on the HN-255 assembly : CN903/MDC-13A board
5. Connect an oscilloscope.
   CH-1 : PB CTL/Circuit board on the HN-255 assembly
   TRIG : SERVO CF/Circuit board on the HN-255 assembly
6. Turn on the main power.
7. Insert the alignment tape MR2-1P.



Check Procedure

1. Alignment tape playback

Play back the alignment tape MR2-1P (from 01 : 00 to 15 : 00).

2. CTL head height check

(1) Check that the level decreases when the portion A of the tape is pushed down by skewer.
If the level increases, perform step 3.

(2) Check in the same manner that the level decreases when the portion B of the tape is pushed up by skewer.
If the level increases, perform step 3.

Adjustment Procedure

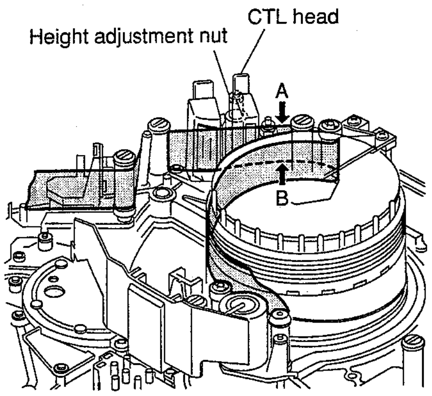
3. CTL head height adjustment

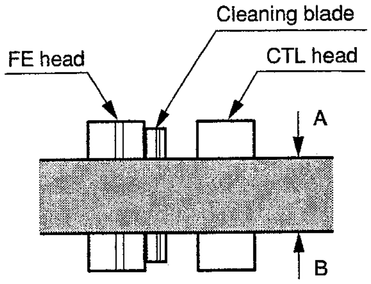
- If the level increases when you push down the tape : Rotate the height adjustment nut counter-clockwise until the maximum output waveform is obtained.

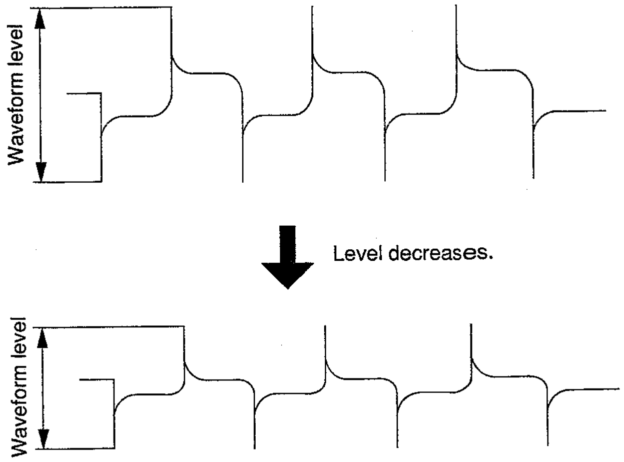
- If the level increases when you push up the tape : Rotate the height adjustment nut in clockwise until the maximum output waveform is obtained.

4. CTL head height recheck

Recheck the CTL head height following steps 1 and 2.







Specifications : Level must decrease when tape is raised up and pushed down by hand.

When the Adjustment is Performed

5. CTL head position adjustment

(Refer to Section 8-2-4.)

6. TC head position adjustment

(Refer to Section 8-2-6.)

8-2-4. CTL Head Position Adjustment

Notes

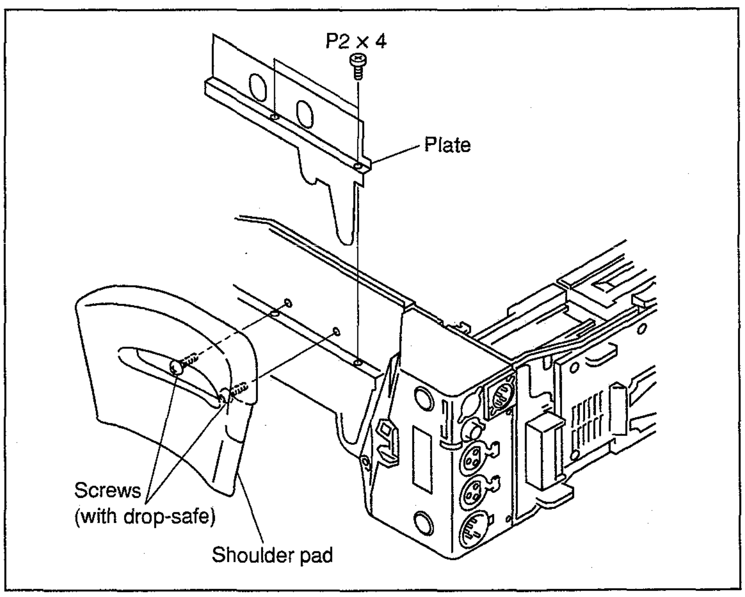
- The CTL head position adjustment is closely related with the TC head position adjustment.
- When the CTL head position adjustment is performed, be sure to perform the TC head position adjustment.

Tools

• HN-255 assembly :	A-8315-553-A
• Alignment tape MR2-1P :	8-960-077-61
• Nut driver (for across : 4.5 mm) :	7-700-751-01
• Oscilloscope	

Preparations

1. Turn the POWER switch to OFF.
2. Remove the front lid and the outside panel assembly. (Refer to Section 1-4.)
3. Remove the shoulder pad and the plate.
4. Connect the HN-255 assembly to the MDC-13A board.
   5-pin connector on the HN-255 assembly :
   CN902/MDC-13A board
   8-pin connector on the HN-255 assembly :
   CN903/MDC-13A board
5. Connect an oscilloscope.
   CH-1 : REC A PB/Circuit board on the HN-255 assembly
   CH-2 (TRIG) : SERVO CF/Circuit board on the HN-255 assembly
6. Turn on the main power.
7. Insert the alignment tape MR2-1P.



Check Procedure

1. Alignment tape playback

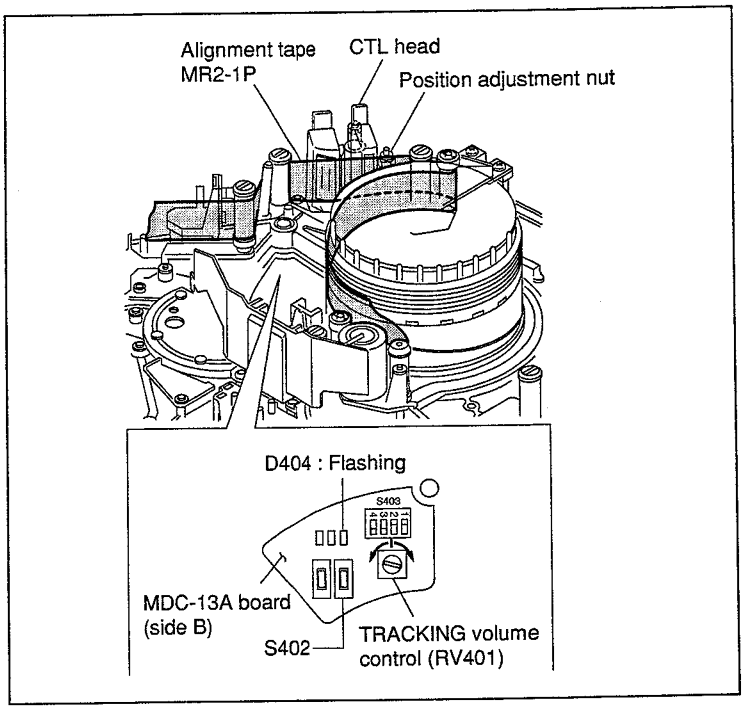
Play back the alignment tape MR2-1P (from 01 : 00 to 15 : 00).

2. CTL head position check

(1) Set the switch S402/MDC-13A board (side B) to ON.
Then D404 turns on and operation of the TRACKING control knob is enabled.

(2) Rotate the TRACKING control (RV401)/ MDC-13A board until the center of the RF envelope waveform becomes maximum.
Check at this time that the marker appears on the envelope waveform as shown.

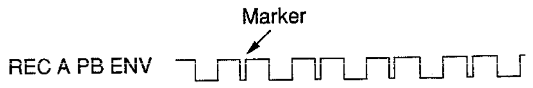
(3) Set the switch S402/MDC-13A board to OFF and set the TRACKING control to the FIX position.
Check at this time that the output level of the envelope waveform remains unchanged as same level as in step (2).
If the specification is not satisfied, perform step 3 and the subsequent steps.



Adjustment Procedure

3. CTL head position adjustment

Adjust the CTL head position adjustment nut with a nut driver until the marker appears on the envelope waveform at the same time the output level of the center of the RF envelope waveform becomes maximum.



Specification : Adjust the CTL head position until the following two requirements are met. First, the marker appears in the envelope waveform.
Second, amplitude of the center of the envelope waveform must be maximum.
(Marker appears in all tracks.)

4. CTL head position recheck

Recheck the CTL head position following the steps 1 and 2.

When the adjustment is performed

5. TC head position adjustment

(Refer to Section 8-2-6.)

8-2-5. TC Head Height Adjustment

Notes

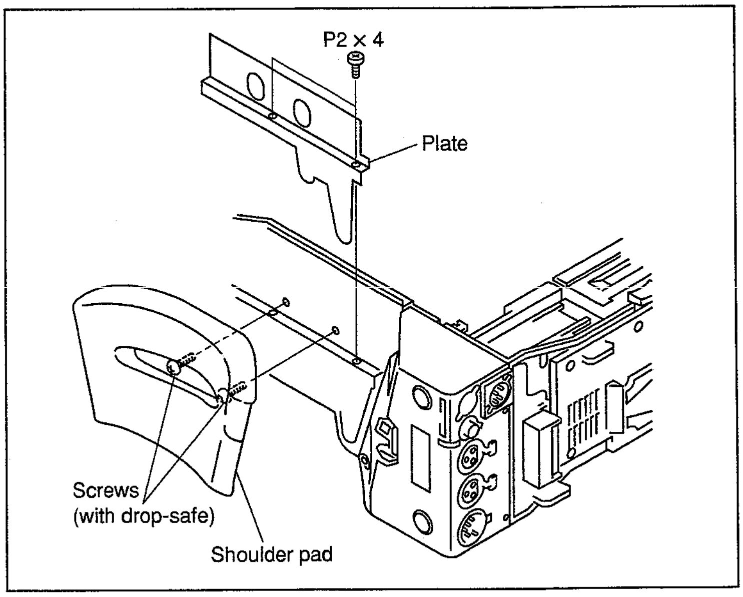
- The TC head height adjustment is closely related to position adjustment.
- When the TC head height adjustment is performed, be sure to perform the related other adjustments (or checks).

Tools

• Alignment tape MR2-1P :	8-960-077-61
• HN-255 assembly :	A-8315-553-A
• Nut driver	
• Oscilloscope	

Preparations

1. Turn the POWER switch to OFF.
2. Remove the front lid and the outside panel assembly. (Refer to Section 1-4.)
3. Remove the shoulder pad and the plate.
4. Connect the HN-255 assembly to the MDC-13A board.
   5-pin connector on the HN-255 assembly :
   CN902/MDC-13A board
   8-pin connector on the HN-255 assembly :
   CN903/MDC-13A board
5. Connect an oscilloscope.
   CH-1 : PB TC/Circuit board on the HN-255 assembly
6. Turn the POWER switch to ON.
7. Insert the alignment tape MR2-1P.



Check Procedure

1. Alignment tape playback

Play back the alignment tape MR2-1P (from 01 : 00 to 15 : 00).

2. TC head height check

(1) When the portion A of the tape as shown in illustration is pushed down, check that the level decreases.
If the level increases, perform step 3.

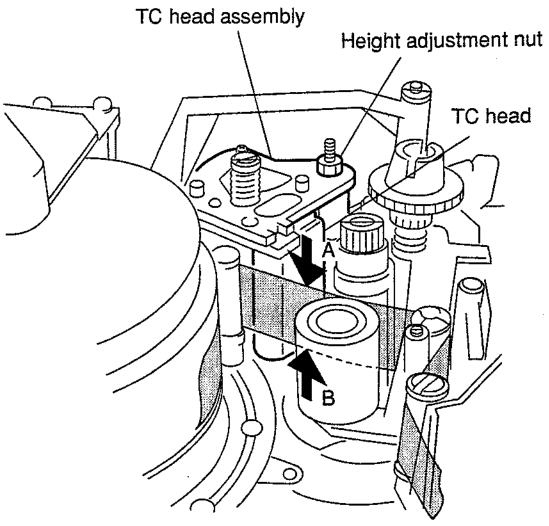
(2) When the portion B of the tape as shown in illustration is pushed up, check that the level decreases in the same manner.
If the level increases, perform step 3.

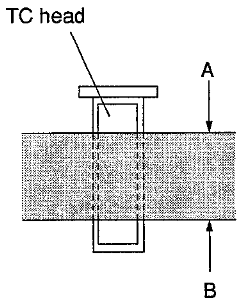
(3) Repeat changing the mode from the EJECT state to the PLAY state a few times and check that the output level remains unchanged from the previous level.
If the level changes, perform step 3.

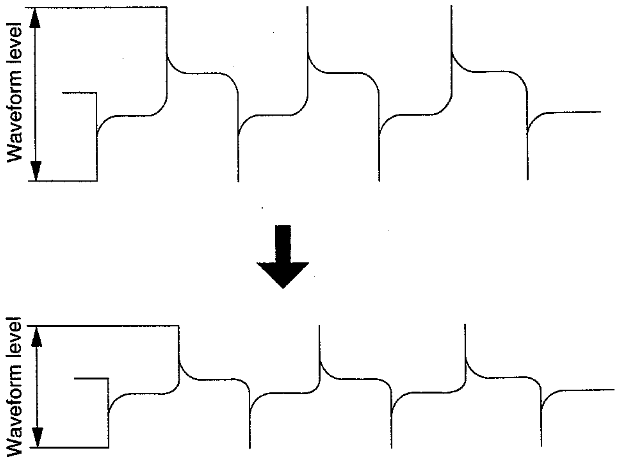
(4) Repeat changing the mode from REV × 3 to PLAY a few times and check that the output level remains unchanged from the previous level.
If the level changes, perform step 3.

How to enter the REV × 3 mode

After pressing the PLAY button, press the REW button.
(Both the PLAY and REW buttons on the keyboard turn on.)







Specifications : Level must decrease when tape is raised up and pushed down by hand.

Adjustment Procedure

3. TC head height adjustment

- If the level increases when you push down the tape : Rotate the height adjustment nut in counterclockwise until the maximum output waveform is obtained.
- If the level increases when you push up the tape : Rotate the height adjustment nut in clockwise until the maximum output waveform is obtained.

4. TC head position adjustment

(Refer to Section 8-2-6.)

5. TC head height check

Recheck it following step 2.

8-2-6. TC Head Position Adjustment

Notes

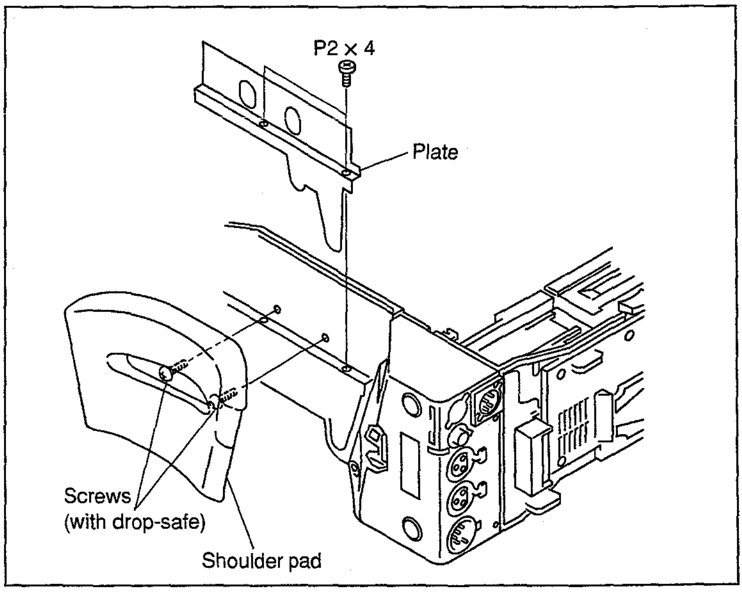
- Be sure to complete the CTL head position adjustment before starting this adjustment. The CUE/TC head position adjustment is adjusted using the CTL head position as the reference of the adjustment.
- The TC head position adjustment is closely related to the TC head height adjustment.
- When the TC head position adjustment is performed, be sure to perform the related other adjustments (or checks).

Tools

• Alignment tape MR2-1P :	8-960-077-61
• Torque screwdriver bit (for M2) :	J-6325-380-A
• Torque screwdriver (for 3 kg) :	J-6325-400-A
• HN-255 assembly :	A-8315-553-A
• Oscilloscope	

Preparations

1. Turn the POWER switch to OFF.
2. Remove the front lid and the outside panel assembly. (Refer to Section 1-4.)
3. Remove the shoulder pad and the plate.
4. Connect the HN-255 assembly to the MDC-13A board.
   5-pin connector on the HN-255 assembly : CN902/MDC-13A board
   8-pin connector on the HN-255 assembly : CN903/MDC-13A board
5. Connect an oscilloscope.
   CH-1 : SHAPED CTL/Circuit board on the HN-255 assembly
   CH-2 : TC/Circuit board on the HN-255 assembly
   TRIG : SV REF CF/Circuit board on the HN-255 assembly
6. Turn the POWER switch to ON.
7. Insert the alignment tape MR2-1P.



Check Procedure

1. Alignment tape playback

Play back the alignment tape MR2-1P (from 01 : 00 to 15 : 00).

2. TC head position check

(1) Confirm that the relationship between the CTL pulse fall-down edge and the TC signal rise-up edge satisfies the specifications.

If the specification is not satisfied, perform step 3 and the subsequent steps.

(2) Repeat changing the mode from the EJECT state to the PLAY state a few times and confirm that the specification is satisfied.

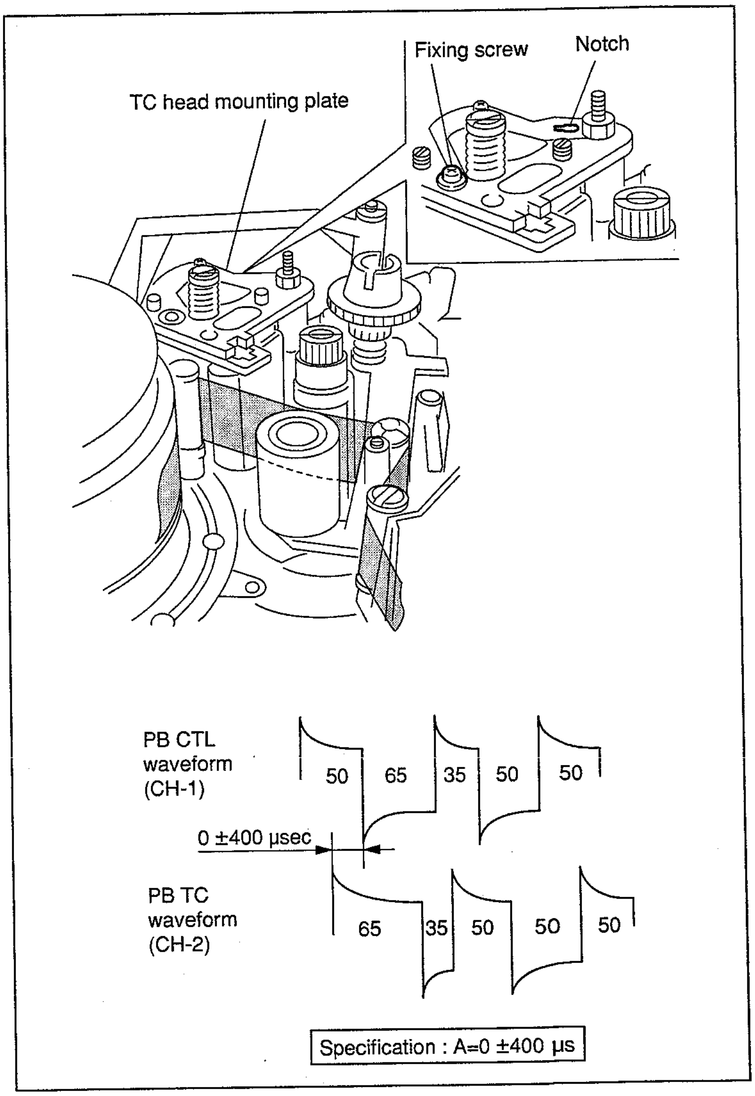
If the specification is not satisfied, perform step 3 and the subsequent steps.

(3) Repeat changing the mode from REV × 3 to PLAY a few times and confirm that the specification is satisfied.

If the specification is not satisfied, perform step 3 and the subsequent steps.

How to enter the REV × 3 mode

After pressing the PLAY button, press the REW button.
(Both the PLAY and REW buttons on the keyboard turn on.)



Specification : A=0 ±400 µs

Adjustment Procedure

3. TC head position adjustment

(1) Loosen the fixing screw of the TC head mounting plate by 1/4 to 1/2 turn.

(2) Insert a flat head (−) screwdriver tip into the notch of the TC head mounting plate .

(3) Adjust the TC head position with screwdriver until the specification is satisfied.

(4) While maintaining the screwdriver setup as step (3), tighten the screw.
Standard tightening torque :
10×10^{-2} N•m (1.0 kgf•cm)

4. TC head position recheck

Recheck it following steps 1 and 2.

5. TC head height check

(Refer to Section 8-2-5.)

6. TC head position recheck

Check it following the steps 1 and 2.

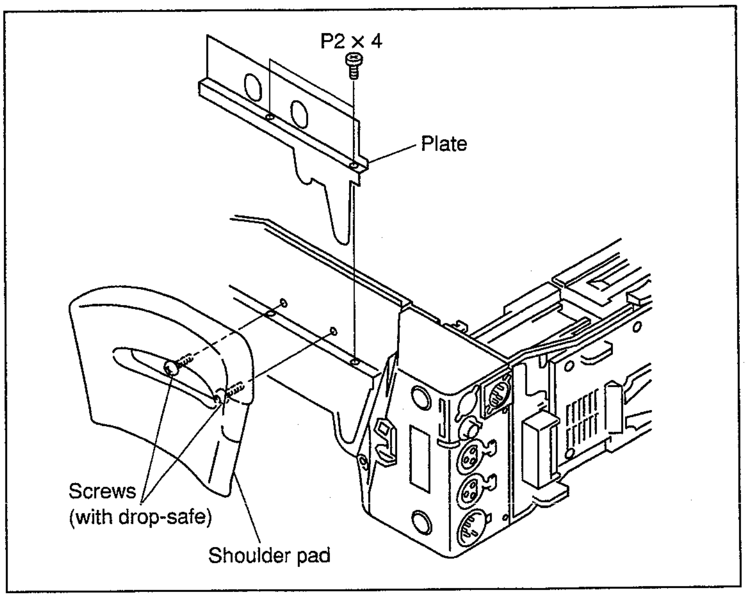
8-2-7. TC Output Level Check, Adjustment

Tools

- Alignment tape MR2-1P : 8-960-077-61
- HN-255 assembly : A-8315-553-A
- Cassette tape BCT-60MX : Commercially available
- Oscilloscope

Preparations

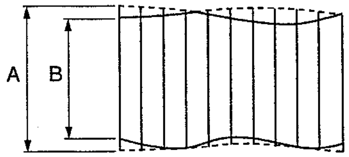
1. Turn the POWER switch to OFF.
2. Remove the front lid and the outside panel assembly. (Refer to Section 1-4.)
3. Remove the shoulder pad and the plate.
4. Connect the HN-255 assembly to the MDC-13A board.
   5-pin connector on the HN-255 assembly : CN902/MDC-13A board
   8-pin connector on the HN-255 assembly : CN903/MDC-13A board
5. Connect an oscilloscope.
   CH-1 : PB TC/Circuit board on the HN-255 assembly
   TRIG : CH-1
6. Turn the POWER switch to ON.
7. Insert the alignment tape MR2-1P.



Check Procedure

1. TC output level check

(1) Play back the alignment tape MR2-1P (from 15 : 00 to 25 : 00).
(2) Confirm that fluctuation of the TC output level satisfies the specification 1.
(3) Enter the REV × 1 state.
(4) Confirm that fluctuation of the TC output level (level at this state is named D) satisfies the specification 2.
(5) When the specification 2 is not satisfied :
When the tape guide has no lower flange, perform the T3 and T5 tape guide height adjustment. (Refer to Section 8-2-1, tape guide height adjustment $\boxed{A}$)
- When the tape guide has the lower flange, perform the T3 tape guide height adjustment. (Refer to Section 8-2-1, tape guide height adjustment $\boxed{B}$)



Specifications 1 : $\frac{B-A}{A} \times 100 \leqq 5\ \%$ (fluctuation)

Specifications 2 : $\frac{D}{A} \times 100 \geqq 70\ \%$

How to enter the REV × 1 mode

(1) Set the × 1 REV SEARCH to ON using the VTR maintenance menu, A40 : PATH MODE SEL.
(2) After pressing the PLAY button, press the REW button. (Both the PLAY and REW buttons on the keyboard turn on.)

2. Tape running check and adjustment when tape tension is minimal

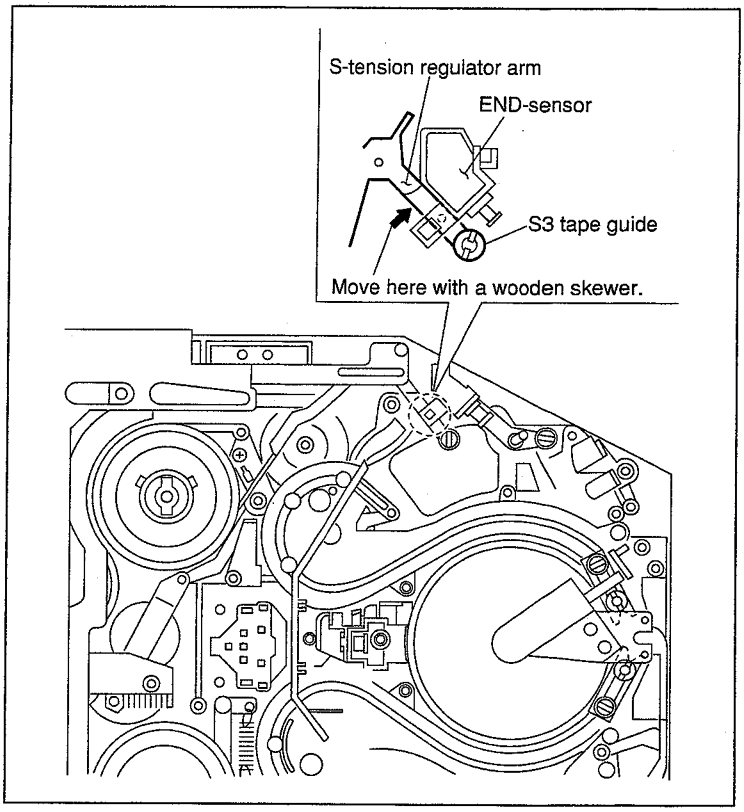
Note

This adjustment item must be performed only when the T3 tape guide has the lower flange. If when the T3 tape guide has no lower flange, this adjustment is not necessary.

Preparation

Make a recording of any signal for five minutes at tape top (from 00 : 00 to 05 : 00) of the BCT-60MX cassette tape.

(1) Move the S-tension regulator arm towards the END-sensor with a wooden skewer. Run a tape under the condition that tape tension is completely removed. (In the PLAY mode, use the tape top position (01 : 00 to 05 : 00) of a BCT-60MX cassette tape.)

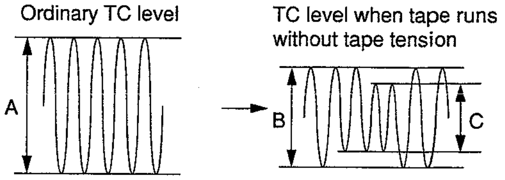


(2) Confirm that the TC output FWD level satisfies the specifications 3 and 4.

Note

If the lower flange of the T3 guide pushes up a tape in the FWD mode, tape running can become faulty.

If the specification is not satisfied, perform the T3 guide height adjustment until the specifications 3 and 4 are satisfied.
(Refer to Section 8-1-7.)



Specification 3 : $\frac{B}{A} \times 100 \geqq 70\ \%$

Specification 4 : $\frac{B-C}{A} \times 100 \leqq 15\ \%$ (deviating)

(3) Confirm the TC output level.
(Refer to step 1 of this adjustment.)

(4) Repeat steps 1 and 2 until the specifications 1 through 4 are all satisfied.

Note

If the specification cannot be satisfied even after the above adjustment is performed, perpendicularity of the pinch roller and T3 guide may possibly be out of specification. Replace the pinch arm assembly (by referring to Section 7-29) and then repeat the above adjustment once again.

Section 9
Camera System Electrical Alignment

9-1. General Information for Electrical Adjustment

This section describes adjustment items that are required after this unit repair is repaired or its board is replaced.

Note

For the adjustment items after replacement of each board, refer to section 1-17.

9-1-1. Note for Adjustment

Before adjustment, set the main POWER switch to on and the VTR switch to SAVE, then warm up the camcorder for about 10 minutes.
Be sure to turn off the power before extending the plug-in board using the extension board.

Indication at the Top Right on the Viewfinder Screen

In adjustment on the setup menu, bars sometimes appear at the top right on the viewfinder screen. The bars indicate the current setting state and adjustable range for the selected item.

Screen Mode Setting

Sets the screen mode as follows before performing the adjustment of the each page.

1. Setup menu
   MENU : OPERATION
   PAGE : 19*FORMAT
   ITEM : 16:9/4:3 SELECT

9-1-2. Equipment/Fixtures

- Oscilloscope
  Tektronix 2465 or equivalent
- Waveform/Vector monitor
  Tektronix 1751 or equivalent
- Color Monitor
  Sony BVM-1411P or equivalent
- Black and white monitor
  Sony BVM-D20F1J or equivalent
- Pattern box (PTB-500, 90 - 240 Vac)
  J-6029-140-B
- Multiburst chart : J-6026-110-A
- Grayscale chart (4:3)
  Transparent type : J-6026-130-B
  Reflective type : Commercially available on market
  (Refer to Section 9-1-4.)
- Grayscale chart (16:9)
  Transparent type : J-6394-080-A

9-1-3. Initial Switch Settings

Some adjustments of the Camera System Electrical Alignment require the service mode of the setup menu to be used. Enter the service mode as follows.
Refer to Section 4 for details of the setup menu.

1. Turn off the POWER switch.
2. Set switch S1-1 on the AT-143 board to the ON position.
3. Turn the POWER switch back on.
4. Set the switch MENU ON/OFF on the inside panel to the ON position.

Note

When any item is adjusted in the service mode, the values of the adjusted item in the user mode are re-set to 0.

Initial Setting

Before performing adjustment, set switches as follows, If the setting of the GAIN switch is changed from the factory set value, reset it to its original value by referring to the operation manual.

Inside panel :
  VTR SAVE/STBY switch → STBY
  GAIN switch → L (0 dB)
  OUTPUT/DCC switch → CAM/OFF
  MENU ON/OFF switch → OFF
  WHITE BAL switch → PRST

Front panel :
  SHUTTER switch → OFF
  Filter selector → 1B

Lens :
  LENS → MANU
  IRIS → C (CLOSE)

Setup menu :
- MENU : OPERATION
  10*GAIN SW
    - GAIN LOW → 0 dB
    - GAIN MID → 9 dB
    - GAIN HIGH → 18 dB
- MENU : PAINT
  01*SW STATUS
    - GAMMA → ON
    - CHROMA → ON
    - MATRIX → ON
    - DETAIL → ON
    - APERTURE → ON
    - TEST SAW → OFF
- MENU : PAINT
  03*BLACK/FLARE
    - TEST OUT SELECT → ENC
- MENU : PAINT
  06*KNEE
    - KNEE → ON
    - WHITE CLIP → ON
- MENU : MAINTENANCE
  14*GENLOCK
    - GENLOCK → ON
    - RETURN VIDEO → OFF

9-1-4. Maintaining the Grayscale Chart

For the VA gain adjustment, using an 89.9 %-reflective grayscale chart is preferable.
If a reflective chart is not available, use a well-maintained pattern box and a transparent grayscale chart for adjustment.
Before beginning adjustment, set the illumination of the light source (or the luminous intensity on the chart surface) properly proceeding as follows and set the color temperature to 3200 K exactly by adjusting light.

Information on the Reflective Grayscale Chart

Recommended chart

The reflective grayscale chart is commercially available.

Recommended chart: Reflective grayscale chart (with a special case)
MURAKAMI COLOR RESEARCH LABORATORY GS-3 or equivalent

Supplier: MURAKAMI COLOR RESEARCH LABORATORY
Address : 3-11-3, Kachidoki, Chuo-ku, Tokyo, JAPAN
Postcode 104-0054
Phone : 81-3-3532-3011
Fax : 81-3-3532-2056

Handling precautions

- Do not touch the chart's surface.
- Do not subject the surface to dirt, scratches or prolonged exposure to sunlight.
- Protect the chart from excess moisture and harmful gas.
- Avoid resting articles against the case.
- Open the case and dry the chart more an hour for a month in no use long period.

Replacement period when the chart is used as the reference

The reflective grayscale chart should be replaced every two years if it used as the reference. Because the chart deteriorates with time and proper adjustment cannot be achieved.
Replacement period varies according to storage conditions of the chart.

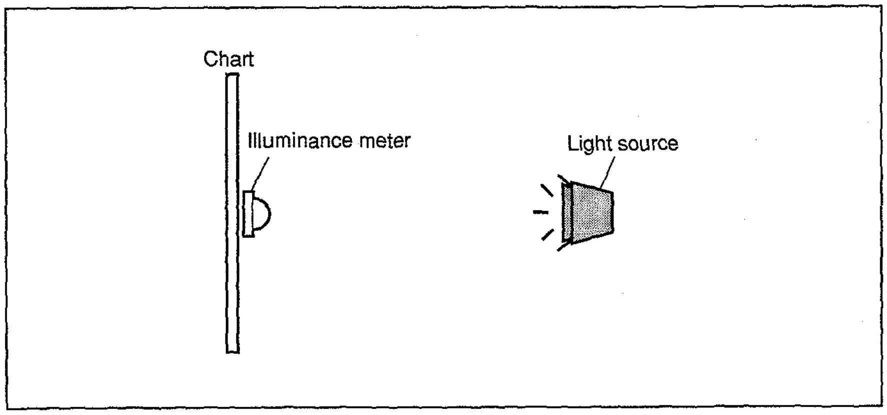
Setting Illumination (when the reflective chart is used)

Equipment: Illuminance meter (Calibrated)

1. Turn on the light source and warm up for about 30 minutes.
2. Place the illuminance meter on the chart surface.
   Adjust the position and angle of the light source so that the whole surface of the chart is evenly 2000 lx.

   Note

   Light the chart from almost the same direction and height as the camera to shoot the chart.



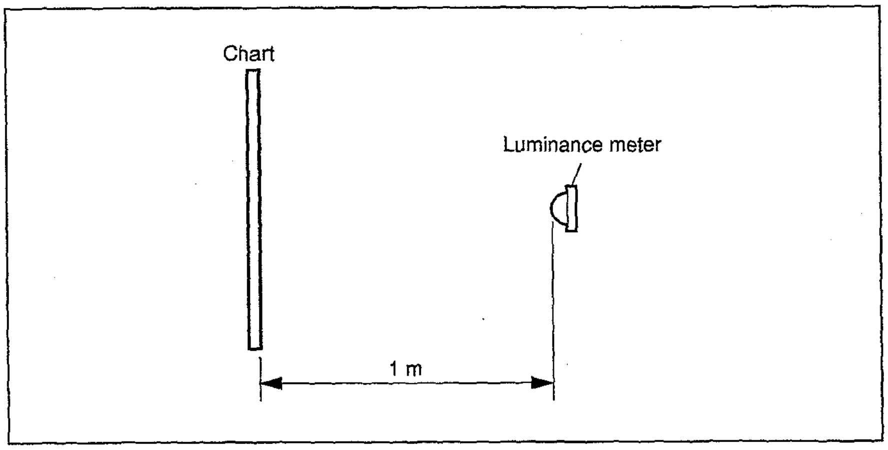
Setting Luminous Intensity (when the transparent chart is used)

Equipment: Luminance meter (Minolta LS-110 or equivalent. Calibrated.)

1. Light the pattern box and warm up for about 30 minutes.
2. Place the pattern box where the chart is not exposed to light, such as a darkroom.
   (Or cover the pattern box with a cover whose inside is painted in black.)
3. Place the luminance meter facing straight to the chart at a distance of 1 m from it.
4. Adjust the luminance control of the pattern box so that the white portion in the center of the chart is 573 ±6 cd/m^2.

   Note

   This corresponds to the luminous intensity on the 89.9 %-reflective chart at 2000 lx.



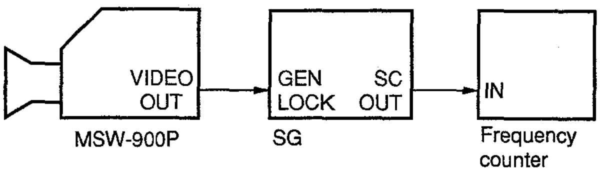
9-2. VCO CONT Frequency Check

Note

- Conduct this check only when the CCD block or DCP-35 board is replaced.
- Before measurement, turn the power ON and warm up the camcorder for about 10 minutes.

Preparation

- Connect as follows.



- On the setup menu, set as follows.
  MENU : SERVICE
  PAGE : 03∗VA ADJUST
  ITEM : TEST OUT SELECT → ENC

Adjustment Procedure

1. Equipment : Frequency counter, Oscilloscope
   Test point : VIDEO OUT connector
   Spec. : 3,579,545 ±10 Hz (NTSC)
   4,433,619 ±5 Hz (PAL)

If the measured value is out of the specification, adjust it as follows.

2. On the setup menu, adjust as follows.
   MENU : SERVICE
   PAGE : 05∗ENC ADJUST
   ITEM : INT FSC FREQ.
   Spec. : 3,579,545 ±10 Hz (NTSC)
   4,433,619 ±5 Hz (PAL)

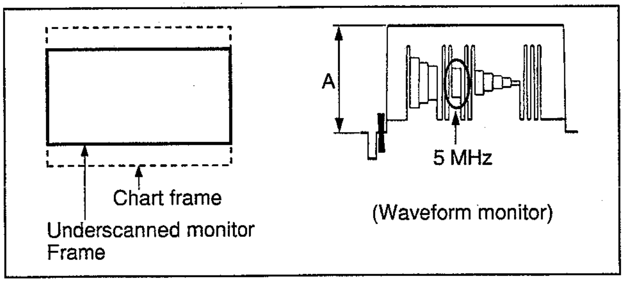
9-3. AD Clock Phase Adjustment

Note

Conduct this check when the CCD block or DCP-35 board is only replaced.

Preparation

- On the setup menu, set as follows.
  MENU : SERVICE
  PAGE : 03*VA ADJUST
  ITEM : TEST OUT SELECT → ENC
- OUTPUT/DCC switch (inside panel) → CAM/ON
- WHITE BAL switch (inside panel) → A
- AUTO W/B BAL switch (front panel) → WHT
  (Perform the automatic white balance adjustment.)
- Shoot a multiburst chart (4:3) in the underscan's horizontal picture frame.
  Test point : VIDEO OUT connector
  setting point : ❷ Lens IRIS
  Spec. : A (white level) = 90 ±2 IRE (NTSC)
  A (white level) = 630 ± 10 mV (PAL)

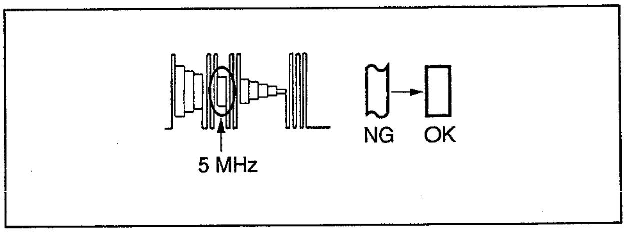


- Pan the camera so that the 5 MHz signal portion of the multiburst chart is positioned at the center of the monitor screen. (Do not change the camera zoom.)

Adjustment Procedure

Equipment : Waveform monitor
Test point : VIDEO OUT connector

1. Select the 16:9 mode.
   MENU : OPERATION
   PAGE : 19*FORMAT
   ITEM : 16:9/4:3 SELECT → 16:9
2. On the setup menu, adjust as follows.
   MENU : SERVICE
   PAGE : 04*AD ADJUST
   ITEM : AD CLOCK PHASE
   Spec. : Maximize the 5 MHz signal portion.
3. On the setup menu, adjust as follows.
   MENU : SERVICE
   PAGE : 04*AD ADJUST
   ITEM : R/B CLOCK PHASE
   Spec. : Adjust the 5 MHz signal portion to nearly horizontal.



9-4. ENC OUT Adjustment

9-4-1. ENC Level Adjustment

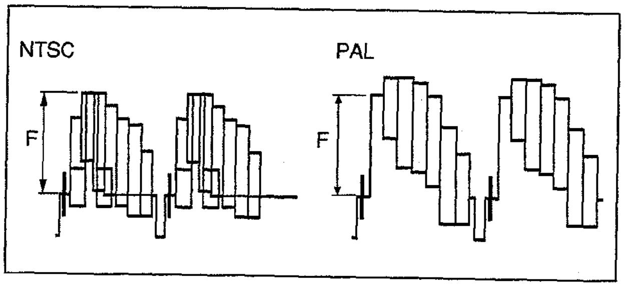
Preparation

- OUTPUT/DCC switch (inside panel) → BARS

Adjustment Procedure

Equipment : Waveform monitor
Test point : TEST OUT connector

1. On the setup menu, adjust as follows.
   MENU : MAINTENANCE
   PAGE : 03∗LEVEL ADJ
   ITEM : ENC VIDEO LEVEL
   Spec. : F = 100 ±2 IRE (NTSC)
   F = 700 ±14 mV (PAL)



9-5. TEST OUT Level Adjustment

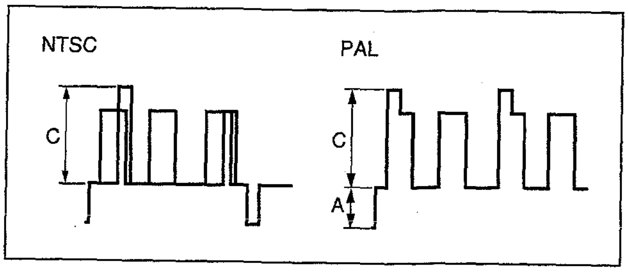
Preparation

- OUTPUT/DCC switch (inside panel) → BARS
- On the setup menu, set as follows.
  MENU : MAINTENANCE
  PAGE : 03∗LEVEL ADJ
  ITEM : TEST OUT SELECT → R, G or B

Adjustment Procedure

Equipment : Waveform/Vector monitor
Test point : TEST OUT connector

1. On the setup menu, adjust as follows.
   MENU : MAINTENANCE
   PAGE : 03∗LEVEL ADJ
   ITEM : RGB LEVEL
   Spec. : C = 100 ±2 IRE (NTSC)
   C = 700 ±14 mV (PAL)



Setting After Adjustment

- On the setup menu, set as follows.
  MENU : MAINTENANCE
  PAGE : 03∗LEVEL ADJ
  ITEM : TEST OUT SELECT → ENC

9-6. Modulator Balance Adjustment

Preparation

- WHITE BAL switch (inside panel) → PRST
- OUTPUT/DCC switch (inside panel) → CAM/ON
- MENU ON/OFF switch (inside panel) → OFF

Adjustment Procedure

1. AUTO W/B BAL switch (front panel) → BLK
   Hold this switch in BLK state until the message "–MOD BAL–" on the viewfinder is displayed .

2. A few seconds later after releasing the switch, check that the message "BLACK OK" is displayed on the viewfinder.

9-7. TEST SAW Adjustment

Preparation

- OUTPUT/DCC switch (inside panel) → CAM/ON
- WHITE BAL switch (inside panel) → PRST

Adjustment Procedure

Equipment : Waveform monitor
Test point : TEST OUT connector

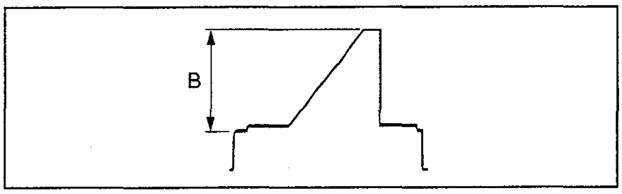
1. On the setup menu, set as follows.
   MENU : PAINT
   PAGE : 01*SW STATUS
   ITEM : GAMMA → OFF

2. AUTO W/B BAL switch (front panel) → BLK
   (Perform the automatic black balance adjustment.)

3. On the setup menu, set as follows.
   MENU : SERVICE
   PAGE : 03*VA ADJUST
   ITEM : TEST SAW → ON

4. On the setup menu, set as follows.
   MENU : SERVICE
   PAGE : 03*VA ADJUST
   ITEM : TEST OUT SELECT → G

5. On the setup menu, adjust as follows.
   MENU : SERVICE
   PAGE : 03∗VA ADJUST
   ITEM : TEST SAW LEVEL
   Spec. : B = 100 ±2 IRE (NTSC)
   B = 700 ±10 mV (PAL)



Setting After Adjustment

- On the setup menu, set as follows.
  MENU : PAINT
  PAGE : 01∗SW STATUS
  ITEM : GAMMA → ON

  MENU : SERVICE
  PAGE : 03∗VA ADJUST
  ITEM : TEST SAW → OFF
  ITEM : TEST OUT SELECT → ENC

9-8. R/B AD Gain Adjustment

Note

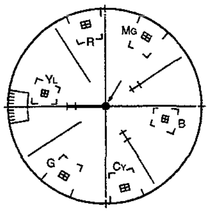
This adjustment is needed only when the VA board or DCP-35 board is replaced.

Preparation

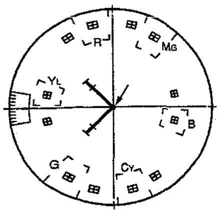
- Connect a waveform monitor to the TEST OUT and vector monitor to the VIDEO OUT connectors respectively.
- WHITE BAL switch (inside panel) → PRST
- On the setup menu, set as follows.
  MENU : PAINT
  PAGE : 01∗SW STATUS
  ITEM : TEST SAW → ON
  ITEM : GAMMA → OFF
  ITEM : KNEE → OFF

Adjustment Procedure

1. On the setup menu, adjust as follows.
   MENU : SERVICE
   PAGE : 04∗AD ADJUST
   ITEM : R AD LEVEL
   Spec. : Adjust the illuminated spot at the center of the vector monitor.



(For NTSC)



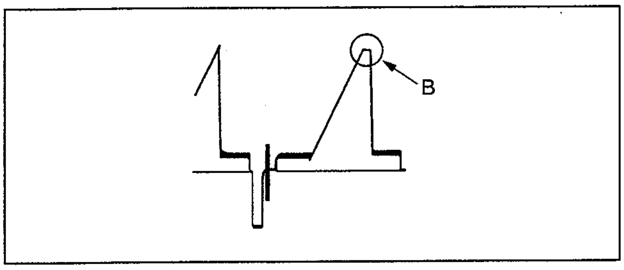
(For PAL)

2. On the setup menu, adjust as follows.
   MENU : SERVICE
   PAGE : 04∗AD ADJUST
   ITEM : B AD LEVEL
   Spec. : Adjust the illuminated spot at the center of the vector monitor.

3. Repeat steps 1 and 2 several times, adjust the illuminated spot at the center of the vector monitor.

(Continued next page.)

4. Make sure that the carrier leakage at portion B is not observed.



Setting After Adjustment

- On the setup menu, set as follows.

MENU : PAINT
PAGE : 01*SW STATUS
ITEM : TEST SAW → OFF
ITEM : GAMMA → ON
ITEM : KNEE → ON

9-9. VA Gain Adjustment

Note

- Use an 89.9%-reflective chart in this adjustment as possible. (Refer to Section 9-1-4.)
- If a "16:9" chart is not keep on hand, shoot a"4:3" chart so that the chart width is aligned with the underscanned monitor frame.

Preparation

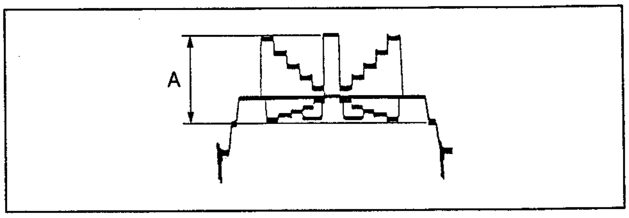
- OUTPUT/DCC switch (inside panel) → CAM/ON
- Shoot a grayscale chart (16:9) in the full underscanned monitor frame.
- WHITE BAL switch (inside panel) → PRST
- AUTO W/B BAL switch (front panel) → BLK (Perform the automatic black balance adjustment.)
- On the setup menu, set as follows.

MENU : MAINTENANCE
PAGE : 10*PRESET WHT
ITEM : COLOR TEMP. <P> : 3200
ITEM : COLOR FINE <P> : 0
ITEM : R GAIN <P> : 0
ITEM : B GAIN <P> : 0

Adjustment Procedure

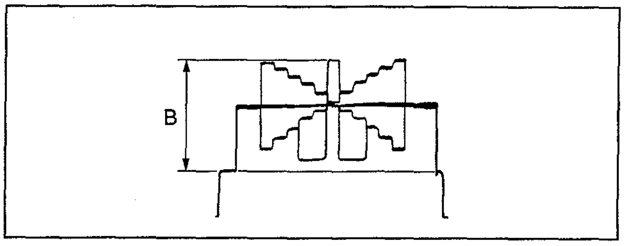
1. Select the 16:9 mode.
   MENU : OPERATION
   PAGE : 19*FORMAT
   ITEM : 16:9/4:3 SELECT → 16:9

2. Equipment : Oscilloscope
   Test point : TP1 (VA-208 board)
   Setting point : ⊘ Lens IRIS
   Spec. : A = 400 ± 10 mV (PAL)



3. On the setup menu, set as follows.
   MENU : PAINT
   PAGE : 03*BLACK/FLARE
   ITEM : TEST OUT SELECT → G

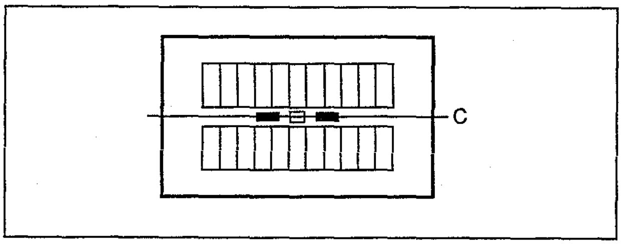
4. Equipment : Waveform monitor
   Test point : TEST OUT connector
   Adj. point : ⊘RV201 (VA-208 board (G GAIN))
   Spec. : B = 100 ±2 IRE (NTSC)
   B = 700 ±10 mV (PAL)



5. On the setup menu, set as follows.
   MENU : PAINT
   PAGE : 03*BLACK/FLARE
   ITEM : TEST OUT SELECT → ENC

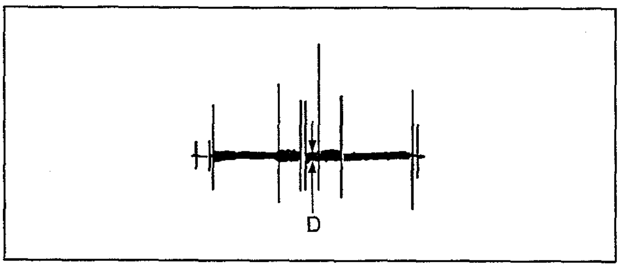
   MENU : PAINT
   PAGE : 01*SW STATUS
   ITEM : GAMMA → OFF

6. Select portion C by using the waveform monitor.



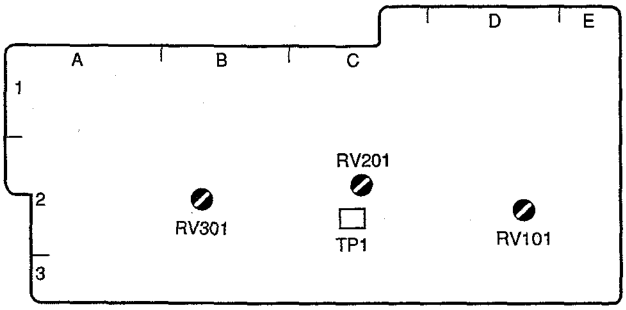
7. Set the waveform monitor to the CHROMA mode.

8. Equipment : Waveform monitor
   Test point : TEST OUT connector
   Adj. point : ⊘RV101 (VA-208 board (R GAIN))
   ⊘RV301 (VA-208 board (B GAIN))
   Spec. : Minimize carrier leakage D by using the variable resistors alternately.



Setting After Adjustment

- On the setup menu, set as follows.
  MENU : PAINT
  PAGE : 01*SW STATUS
  ITEM : GAMMA → ON



VA-208 board (A side)

9-10. Shading Adjustment

9-10-1. Black Shading Adjustment

Note

The unit of which the ROM version of the AT board is 1.40 and higher is provided with the auto black shading adjustment function.
For the ROM version before 1.40, perform from step 2 below.

Preparation

- Lens IRIS → CLOSE
- Waveform monitor setting
  LUM mode
  VOLT FULL SCALE range → 0.5
- Select the 16:9 mode.
  MENU : OPERATION
  PAGE : 19*FORMAT
  ITEM 16:9/4:3 SELECT → 16:9

Adjustment Procedure

Equipment : Waveform monitor
Test point : TEST OUT connector

1. Auto black shading adjustment

(1) On the setup menu, set as follows.
MENU : MAINTENANCE
PAGE : 16*AUTO SHADING
ITEM : AUTO BLK SHADING → EXEC

(2) Push the rotary encoder.

(3) When adjustment ends successfully, the message “COMPLETE” appears.

Note

The auto adjustment takes about 30 seconds.

2. Manual black shading adjustment

When finer adjustment or manual adjustment is required, proceed as follows.

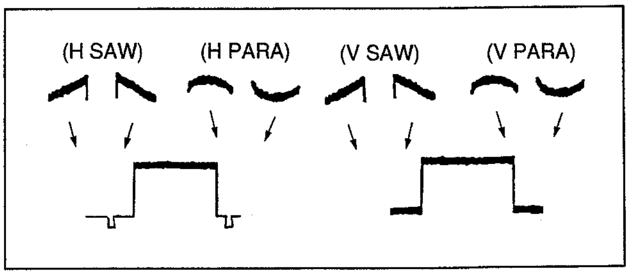
(1) On the setup menu, set as follows.
MENU : MAINTENANCE
PAGE : 02*BLK SHADING
ITEM : TEST OUT SELECT → G

(2) Make the waveform of G-channel flat by setup menu according to the table below.

(3) Adjust the shading for R and B channels in the same way.

TEST OUT	H SAW	V SAW	H PARA	V PARA
G	SHADING CH SEL : G, or TEST*			
TEST OUT → G SELECT	H SAW <BG>	V SAW <BG>	H PARA <BG>	V PARA <BG>
R	SHADING CH SEL : R, or TEST*			
TEST OUT → R SELECT	H SAW <BR>	V SAW <BR>	H PARA <BR>	V PARA <BR>
B	SHADING CH SEL : B, or TEST*			
TEST OUT → B SELECT	H SAW <BB>	V SAW <BB>	H PARA <BB>	V PARA <BB>

* : TEST is displayed only when the unit of which the ROM version of the AT board is 1.40 and higher.



Setting After Adjustment

- On the setup menu, set as follows.
  MENU : MAINTENANCE
  PAGE : 02*BLK SHADING
  ITEM : TEST OUT SELECT → ENC

9-10-2. White Shading Adjustment

Notes

- This adjustment could not be correctly performed if the uneven white pattern is used, luminance is not correct, or lens iris and lens zoom are not in good conditions.
- The unit of which the ROM version of the AT board is 1.40 and higher is provided with the auto white shading adjustment function.
  For the ROM version before 1.40, perform from step 2 below.

Preparation

- Lens IRIS → AUTO
- Shoot a fully occupied white area of pattern box in the underscanned monitor frame.
- Waveform monitor setting
  LUM mode
  VOLT FULL SCALE range → 0.5
- Select the 16:9 mode.
  MENU : OPERATION
  PAGE : 19*FORMAT
  ITEM : 16:9/4:3 SELECT → 16:9

Adjustment Procedure

Equipment : Waveform monitor
Test point : TEST OUT connector

1. Auto white shading adjustment

(1) On the setup menu, set as follows.
MENU : SERVICE
PAGE : 11*SHADING
ITEM : AUTO WHT SHADING → EXEC

(2) Push the rotary encoder.

(3) When adjustment ends successfully, the message "COMPLETE" appears.

Note

The auto adjustment takes about 30 seconds.

(4) Select the lens to extender and perform the auto adjustment in the same way as described above. When adjustment ends successfully, the message "COMPLETE" appears.

Note

The auto adjustment takes about 30 seconds.

2. Manual white shading adjustment

When finer adjustment or manual adjustment is required, proceed as follows.

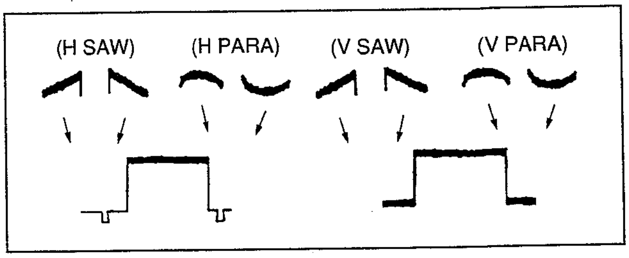
(1) On the setup menu, set as follows.
MENU : MAINTENANCE
PAGE : 01*WHT SHADING
ITEM : TEST OUT SELECT → G

(2) Make the waveform of G-channel flat by setup menu according to the table below.

(3) Adjust the shading for R and B channels in the same way.

TEST OUT	**H SAW**	**V SAW**	**H PARA**	**V PARA**
G	**SHADING CH SEL : G, or TEST***			
TEST OUT→G SELECT	H SAW <WG>	V SAW <WG>	H PARA <WG>	V PARA <WG>
R	**SHADING CH SEL : R, or TEST***			
TEST OUT→R SELECT	H SAW <WR>	V SAW <WR>	H PARA <WR>	V PARA <WR>
B	**SHADING CH SEL : B, or TEST***			
TEST OUT→B SELECT	H SAW <WB>	V SAW <WB>	H PARA <WB>	V PARA <WB>

* : TEST is displayed only when the unit of which the ROM version of the AT board is 1.40 and higher.



(4) Select the lens extender and adjust in the same way.

	TEST OUT	H SAW	V SAW	H PARA	V PARA
G	SHADING CH SEL : G, or TEST*				
	TEST OUT→G SELECT	H SAW (EXT) <WG>	V SAW (EXT) <WG>	H PARA (EXT) <WG>	V PARA (EXT) <WG>
R	SHADING CH SEL : R, or TEST*				
	TEST OUT→R SELECT	H SAW (EXT) <WR>	V SAW (EXT) <WR>	H PARA (EXT) <WR>	V PARA (EXT) <WR>
B	SHADING CH SEL : B, or TEST*				
	TEST OUT→B SELECT	H SAW (EXT) <WB>	V SAW (EXT) <WB>	H PARA (EXT) <WB>	V PARA (EXT) <WB>

* : TEST is displayed only when the AT version is 1.40 and higher.

Setting After Adjustment

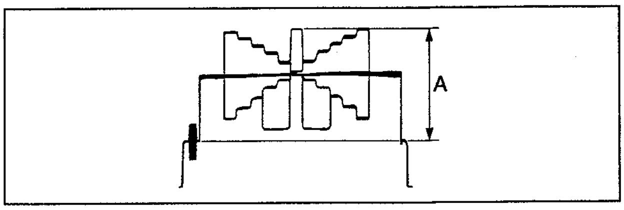
- On the setup menu, set as follows.
  MENU : MAINTENANCE
  PAGE : 01*WHT SHADING
  ITEM : TEST OUT → ENC

9-11. Gamma Correction Adjustment

16:9 mode

Preparation

- Lens IRIS → MAN
- OUTPUT/DCC switch (inside panel) → CAM/ON
- Shoot a grayscale chart (16:9) in the full underscanned monitor frame.
  Equipment : Waveform/Vector monitor
  Test point : TEST OUT connector
  Setting point : ❷ Lens IRIS
  Spec. : A (white level) = 100 ±2 IRE (NTSC)
  A (white level) = 700 ± 14 mV (PAL)



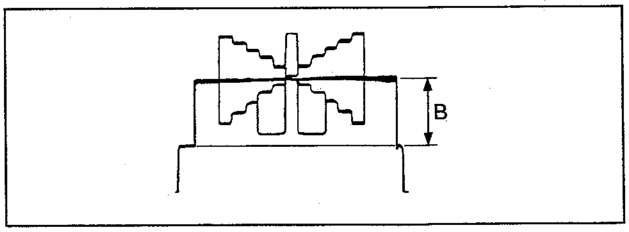
- On the setup menu, set as follows.
  MENU : PAINT
  PAGE : 04*GAMMA
  ITEM : TEST OUT SELECT → G

Adjustment Procedure

Equipment : Waveform/Vector monitor
Test point : TEST OUT connector

1. Select the 16:9 mode.
   MENU : OPERATION
   PAGE : 19*FORMAT
   ITEM : 16:9/4:3 SELECT → 16:9

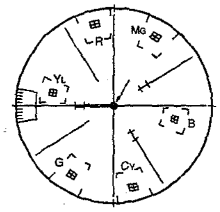
2. On the setup menu, adjust as follows.
   MENU : PAINT
   PAGE : 04*GAMMA
   ITEM : MASTER GAMMA
   Spec. : B = 63 ±2 IRE (NTSC)
   B = 420 ± 14 mV (PAL)



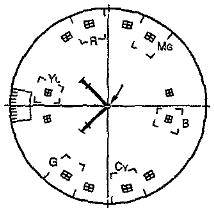
3. On the setup menu, set as follows.
   MENU : PAINT
   PAGE : 04*GAMMA
   ITEM : TEST OUT SELECT → ENC

   MENU : PAINT
   PAGE : 01*SW STATUS
   ITEM : TEST SAW → ON

4. On the setup menu, adjust as follows.
   MENU : PAINT
   PAGE : 04*GAMMA
   ITEM : R GAMMA
   Spec. : Position the illuminated spot at the center of the vector monitor.



(For NTSC)

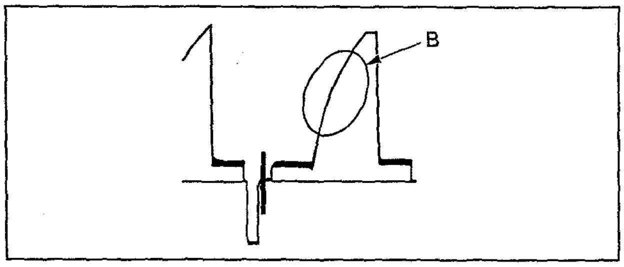


(For PAL)

5. On the setup menu, adjust as follows.
   MENU : PAINT
   PAGE : 04*GAMMA
   ITEM : B GAMMA
   Spec. : Position the illuminated spot at the center of the vector monitor.

6. Repeat steps 4 and 5 several times, position the illuminated spot at the center of the vector monitor.

7. Make sure that the carrier leakage at the portion B is not observed.



Setting After Adjustment

- On the setup menu, set as follows.
  MENU : PAINT
  PAGE : 01*SW STATUS
  ITEM : TEST SAW → OFF

9-12. Black Set Adjustment

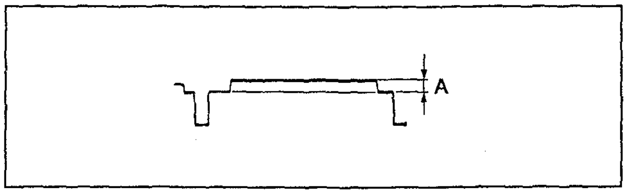
Preparation

- Lens IRIS → CLOSE
- On the setup menu, set as follows.
  MENU : PAINT
  PAGE : 03*BLACK/FLARE
  ITEM : TEST OUT SELECT → G

Adjustment Procedure

Equipment : Waveform monitor
Test point : TEST OUT connector

1. On the setup menu, adjust as follows.
   MENU : PAINT
   PAGE : 03*BLACK/FLARE
   ITEM : MASTER BLACK
   Spec. : A = 10.5 ± 1 IRE (NTSC)
   A = 20 ± 7 mV (PAL)



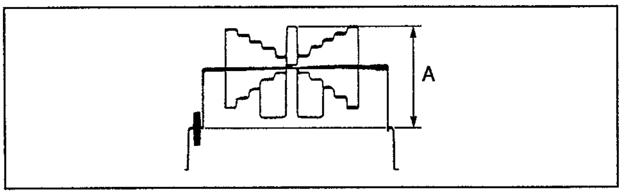
Setting After Adjustment

- On the setup menu, set as follows.
  MENU : PAINT
  PAGE : 03*BLACK/FLARE
  ITEM : TEST OUT SELECT → ENC
- AUTO W/B BAL switch (front panel) → BLK
  (Perform the automatic black balance adjustment.)

9-13. Flare Adjustment

Preparation

- On the setup menu, set as follows.
  MENU : PAINT
  PAGE : 03*BLACK/FLARE
  ITEM : TEST OUT SELECT → ENC
- OUTPUT/DCC switch (inside panel) → CAM/ON
- Shoot a grayscale chart (16:9) in the full underscanned monitor frame.
  Equipment : Waveform monitor
  Test point : TEST OUT connector
  Setting point : ⊘ Lens IRIS
  Spec. : Open the lens iris by one step from the reference setting
  A = 100 ±2 IRE (NTSC)
  A = 700 ±14 mV (PAL)



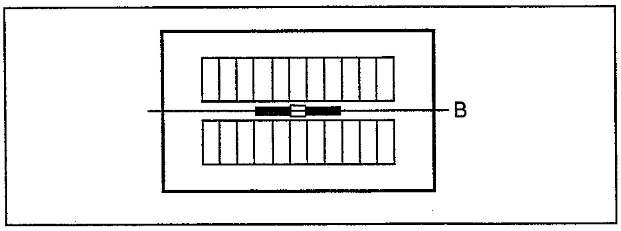
Adjustment Procedure

Equipment : Waveform monitor
Test point : TEST OUT connector

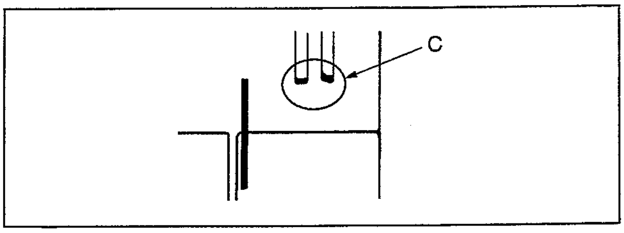
1. Select the 16:9 mode.
   MENU : OPERATION
   PAGE : 19*FORMAT
   ITEM : 16:9/4:3 SELECT → 16:9

2. On the setup menu, set as follows.
   MENU : PAINT
   PAGE : 03*BLACK/FLARE
   ITEM : G FLARE → 0

3. Select portion B by using the waveform monitor.



4. On the setup menu, adjust as follows.
   MENU : PAINT
   PAGE : 03*BLACK/FLARE
   ITEM : R FLARE
   Spec. : Minimize the carrier leakage at portion C



5. On the setup menu, adjust as follows.
   MENU : PAINT
   PAGE : 03*BLACK/FLARE
   ITEM : B FLARE
   Spec. : Minimize the carrier leakage at portion C.

6. Repeat steps 4 and 5 several times.

9-14. Knee Adjustment

9-14-1. Manual Knee Adjustment

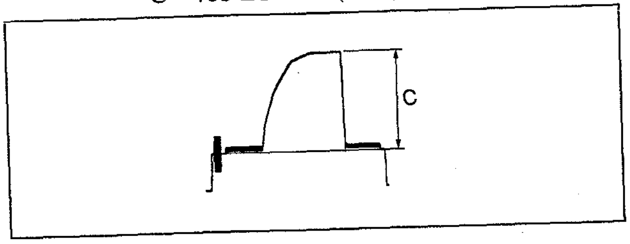
Preparation

- OUTPUT/DCC switch (inside panel) → CAM/OFF
- WHITE BAL switch (inside panel) → PRST
- GAIN switch (inside panel) → M (9 dB)
- On the setup menu, set as follows.
  MENU : PAINT
  PAGE : 01*SW STATUS
  ITEM : TEST SAW → ON
  ITEM : WHITE CLIP → OFF
  ITEM : KNEE → ON

Adjustment Procedure

Equipment : Waveform monitor
Test point : TEST OUT connector

1. On the setup menu, adjust as follows.
   MENU : PAINT
   PAGE : 06*KNEE
   ITEM : KNEE SLOPE
   Spec. : C = 109 ±2 IRE (NTSC)
   C = 735 ±14 mV (PAL)



Setting After Adjustment

- GAIN switch (inside panel) → L (0 dB)
- On the setup menu, set as follows.
  MENU : PAINT
  PAGE : 01*SW STATUS
  ITEM : TEST SAW → OFF
  ITEM : WHITE CLIP → ON
  ITEM : KNEE → ON

Note

The values used in the above adjustment are for the conditions that the white clip level is set to 763 mV. When the white clip level is set to a value other than 763 mV, use the following table to set the levels of the knee point and knee slope.

	WHITE CLIP LEVEL (Unit : mV)			
	763	**749**	**735**	**721**
KNEE POINT	686	686	672	672
KNEE SLOPE	763	750	750	750
WHITE CLIP	763	750	735	721

9-14-2. DCC Pre Knee Adjustment

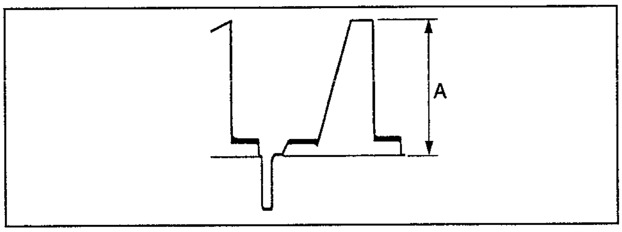
Preparation

- OUTPUT/DCC switch (inside panel) → CAM/ON
- WHITE BAL switch (inside panel) → PRST
- On the setup menu, set as follows.
  MENU : PAINT
  PAGE : 01*SW STATUS
  ITEM : WHITE CLIP → OFF
  ITEM : TEST SAW → ON

Adjustment Procedure

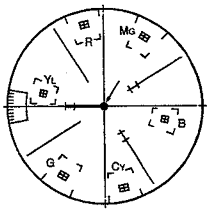
Equipment : Waveform/Vector monitor
Test point : TEST OUT connector

1. On the setup menu, adjust as follows.
   MENU : SERVICE
   PAGE : 03*VA ADJUST
   ITEM : PREKNEE ADJ MODE → MODE1
   ITEM : TEST OUT SELECT → G
   ITEM : G PREKNEE
   Spec. : A = 100 ± 2 IRE (NTSC)
   A = 700 ± 14 mV (PAL)

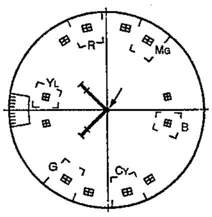


2. On the setup menu, set as follows.
   MENU : SERVICE
   PAGE : 03*VA ADJUST
   ITEM : TEST OUT SELECT → ENC

3. On the setup menu, adjust as follows.
   MENU : SERVICE
   PAGE : 03*VA ADJUST
   ITEM : R PREKNEE
   Spec. : Position the illuminated spot at the center of the vector monitor.



(For NTSC)

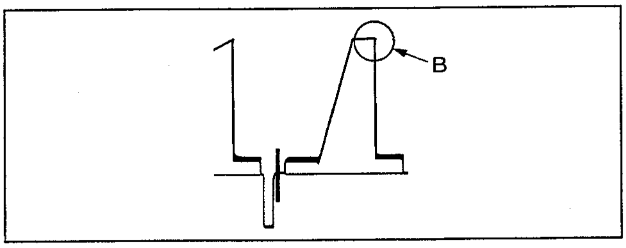


(For PAL)

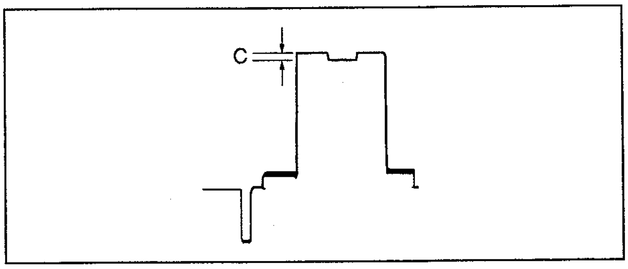
4. On the setup menu, adjust as follows.
   MENU : SERVICE
   PAGE : 03*VA ADJUST
   ITEM : B PREKNEE
   Spec. : Position the illuminated spot at the center of the vector monitor.

5. Repeat steps 3 and 4 several times, position the illuminated spot at the center of the vector monitor.

6. Make sure that the carrier leakage at portion B is minimum.



7. On the setup menu, adjust as follows.
   MENU : SERVICE
   PAGE : 03*VA ADJUST
   ITEM : PREKNEE ADJ MODE → MODE 2
   ITEM : TEST OUT SELECT → G
   ITEM : G PREKNEE
   Spec. : Remove any signal amplitude difference. (Makes flat.)



8. On the setup menu, adjust as follows.
   MENU : SERVICE
   PAGE : 03*VA ADJUST
   ITEM : TEST OUT SELECT → R
   ITEM : R PREKNEE
   Spec. : Remove any signal amplitude difference. (Makes flat.)

9. On the setup menu, adjust as follows.
   MENU : SERVICE
   PAGE : 03*VA ADJUST
   ITEM : TEST OUT SELECT → B
   ITEM : B PREKNEE
   Spec. : Remove any signal amplitude difference.
   (Makes flat.)

10. Repeat steps 7 to 9 several times.

Setting After Adjustment

- On the setup menu, set as follows.
  MENU : SERVICE
  PAGE : 03*VA ADJUST
  ITEM : PREKNEE ADJ MODE → OFF
  ITEM : TEST OUT SELECT → ENC

  MENU : PAINT
  PAGE : 01*SW STATUS
  ITEM : TEST SAW → OFF
  ITEM : WHITE CLIP → ON

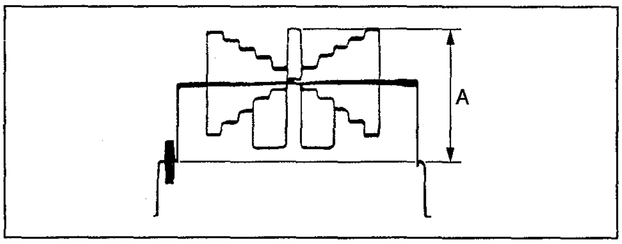
9-14-3. DCC Knee Adjustment

Note

Perform this adjustment, if necessary, to suit the customer's preferences.

Preparation

- WHITE BAL switch (inside panel) → PRST
- On the setup menu, set as follows.
  MENU : MAINTENANCE
  PAGE : 11∗DCC ADJUST
  ITEM : DCC POINT → 0
  ITEM : DCC GAIN → 0
- OUTPUT/DCC switch (inside panel) → CAM/ON
- Shoot a grayscale chart in the full underscanned monitor frame.
- AUTO W/B BAL switch (front panel) → WHT
  (Perform the automatic white balance adjustment.)
- Equipment : Waveform monitor
  Test point : TEST OUT connector
  Setting point : ❷ Lens IRIS
  Spec. : Open the lens iris by 2.5 steps from the reference setting
  A = 100 ±2 IRE (NTSC)
  A = 700 ±14 mV (PAL)



Adjustment Procedure

Equipment : Waveform monitor
Test point : TEST OUT connector

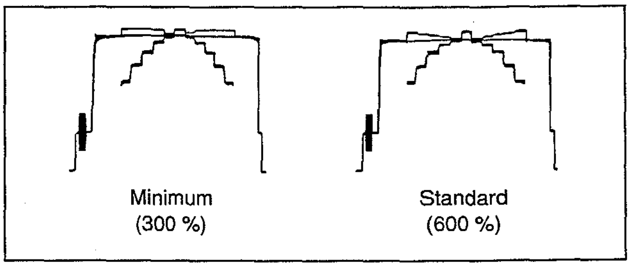
1. On the setup menu, adjust as follows.
   MENU : MAINTENANCE
   PAGE : 11∗DCC ADJUST
   ITEM : DCC D RANGE
   (Factory setting : 600 %)
   Spec. : Set the desired dynamic range.

2. On the setup menu, adjust as follows.
   MENU : MAINTENANCE
   PAGE : 11∗DCC ADJUST
   ITEM : DCC POINT (Factory setting : 0)
   Spec. : Set the desired knee characteristics.

3. Select the lens extender, shoot a grayscale chart in the full underscanned monitor frame.

4. Return the lens extender to its normal position.

5. On the setup menu, adjust as follows.
   MENU : MAINTENANCE
   PAGE : 11∗DCC ADJUST
   ITEM : DCC GAIN (Factory setting : 0)
   Spec. : Set the desired knee characteristics.

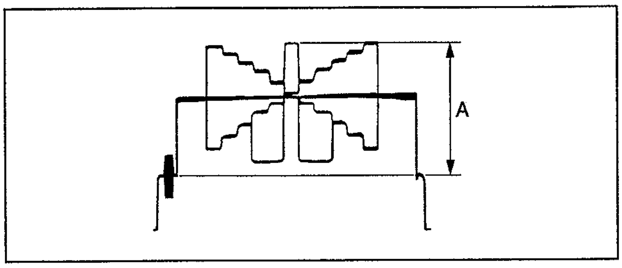


9-15. Detail Signal Adjustment

9-15-1. Crispening Adjustment

Preparation

- On the setup menu, set as follows.
  MENU : PAINT
  PAGE : 07*DETAIL 1
  ITEM : DETAIL → ON
- OUTPUT/DCC switch (inside panel) → CAM/ON
- Shoot a grayscale chart in the full underscanned monitor frame.
  Equipment : Waveform monitor
  Test point : TEST OUT connector
  Setting point : ⊘ Lens IRIS
  Spec. : A = 100 ±2 IRE (NTSC)
  A = 700 ±14 mV (PAL)



Adjustment Procedure

Equipment : Black and white monitor
Test point : TEST OUT connector

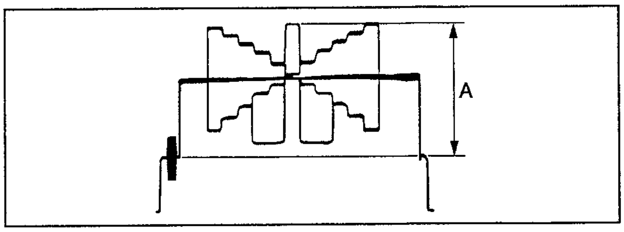
1. On the setup menu, adjust as follows.
   MENU : PAINT
   PAGE : 07*DETAIL 1
   ITEM : CRISPENING
   Spec. : Reduce the noise at gray portion to a permissible level.

9-15-2. Level Dependent Adjustment

Preparation

- On the setup menu, set as follows.
  MENU : PAINT
  PAGE : 04*GAMMA
  ITEM : TEST OUT SELECT → ENC

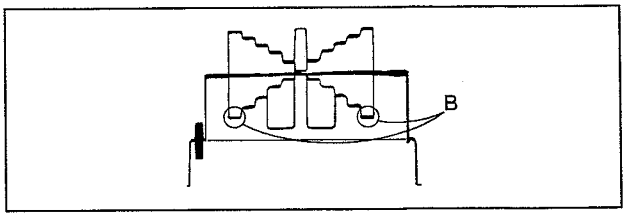
  MENU : PAINT
  PAGE : 07*DETAIL 1
  ITEM : DETAIL → ON
  ITEM : LVL DEPEND → ON
- OUTPUT/DCC switch (inside panel) → CAM/ON
- Shoot a grayscale chart in the full underscanned monitor frame.
  Equipment : Waveform monitor
  Test point : TEST OUT connector
  Setting point : ⊘ Lens IRIS
  Spec. : A = 100 ±2 IRE (NTSC)
  A = 700 ±14 mV (PAL)



Adjustment Procedure

Equipment : Waveform monitor
Test point : TEST OUT connector

1. On the setup menu, adjust as follows.
   MENU : PAINT
   PAGE : 07*DETAIL 1
   ITEM : LV. DEPEND LVL
   Spec. : Eliminate the detail signal from portion B.



Note
After this adjustment, be sure to perform Section 9-15-4 "H/V Ratio Adjustment", and Section 9-15-5 "Detail Level Adjustment", in that order.

9-15-3. Detail Frequency Adjustment

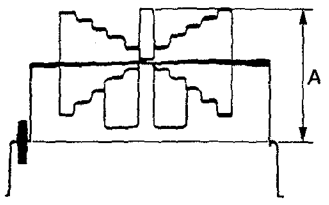
Note

Perform this adjustment, if necessary, to suit the customer's preferences.

Preparation

- On the setup menu, set as follows.
  MENU : PAINT
  PAGE : 07*DETAIL 1
  ITEM : DETAIL → ON

  MENU : PAINT
  PAGE : 03*BLACK/FLARE
  ITEM : TEST OUT SELECT → ENC
- OUTPUT/DCC switch (inside panel) → CAM/ON
- Shoot a grayscale chart in the full underscanned monitor frame.
  Equipment : Waveform monitor
  Test point : TEST OUT connector
  Setting point : ⊘ Lens IRIS
  Spec. : A = 100 ±2 IRE (NTSC)
  A = 700 ±14 mV (PAL)

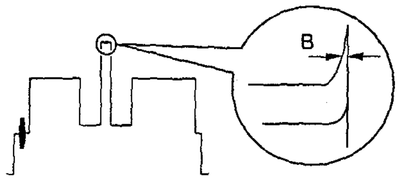


- Select the line at the center white portion of the grayscale chart.

Adjustment Procedure

Equipment : Waveform monitor
Test point : TEST OUT connector

1. On the setup menu, adjust as follows.
   MENU : PAINT
   PAGE : 07*DETAIL 1
   ITEM : DETAIL FREQ. (Factory setting: 0)
   Spec. : Set the desired width at the edge of portion B.



Note

After this adjustment, be sure to perform Section 9-15-4 "H/V Ratio Adjustment", and Section 9-15-5 "Detail Level Adjustment", in that order.

9-15-4. H/V Ratio Adjustment

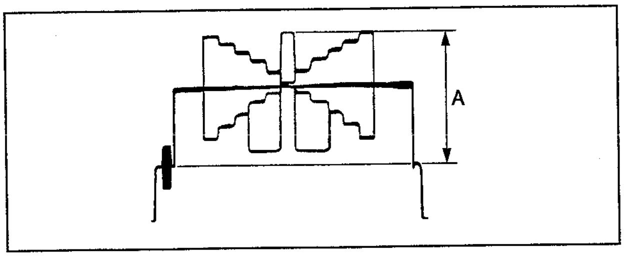
Note

Perform this adjustment, if necessary, to suit the customer's preferences.

Preparation

- On the setup menu, set as follows.
  MENU : PAINT
  PAGE : 07*DETAIL 1
  ITEM : DETAIL → ON

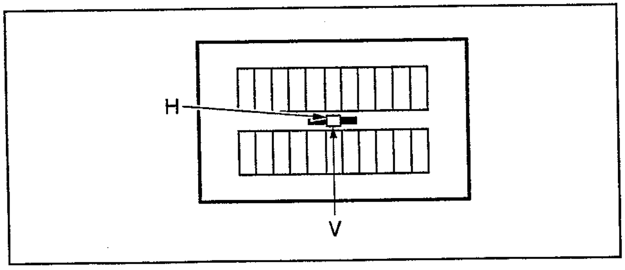
  MENU : PAINT
  PAGE 04*GAMMA
  ITEM : TEST OUT SELECT → ENC
- OUTPUT/DCC switch (inside panel) → CAM/ON
- Shoot a grayscale chart in the full underscanned monitor frame.
  Equipment : Waveform monitor
  Test point : TEST OUT connector
  Setting point : ⊘ Lens IRIS
  Spec. : A = 100 ± 2 IRE (NTSC)
  A = 700 ± 14 mV (PAL)



Adjustment Procedure

Equipment : Black and white monitor
Test point : TEST OUT connector

1. On the setup menu, adjust as follows.
   MENU : PAINT
   PAGE : 07*DETAIL 1
   ITEM : DTL H/V RATIO
   Spec. : Adjust the ratio of the detail signals (white side) that are added horizontally and vertically to the desired ratio.



9-15-5. Detail Level Adjustment

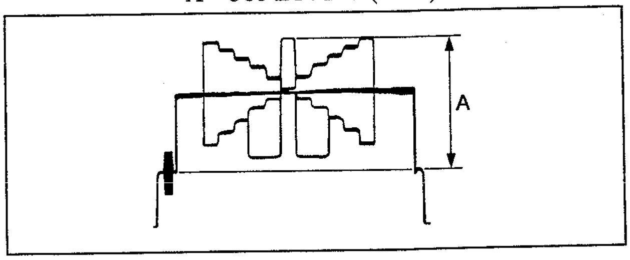
Note

Perform this adjustment, if necessary, to suit the customer's preferences.

Preparation

- On the setup menu, set as follows.
  MENU : PAINT
  PAGE : 07*DETAIL 1
  ITEM : DETAIL → ON

  MENU : PAINT
  PAGE : 04*GAMMA
  ITEM : TEST OUT SELECT → ENC
- Shoot a grayscale chart in the full underscanned monitor frame.
  Equipment : Waveform monitor
  Test point : TEST OUT connector
  Setting point : ⊘ Lens IRIS
  Spec. : A = 80 ±2 IRE (NTSC)
  A = 560 ±14 mV (PAL)



Adjustment Procedure

Equipment : Waveform monitor
Test point : TEST OUT connector

1. On the setup menu, adjust as follows.
   MENU : PAINT
   PAGE : 07*DETAIL 1
   ITEM : DETAIL LEVEL (Factory setting: 0)
   Spec. : Adjust to the detail amount which is added to each step in the grayscale chart for the customer's preferences.

9-15-6. Knee Aperture Adjustment

Note

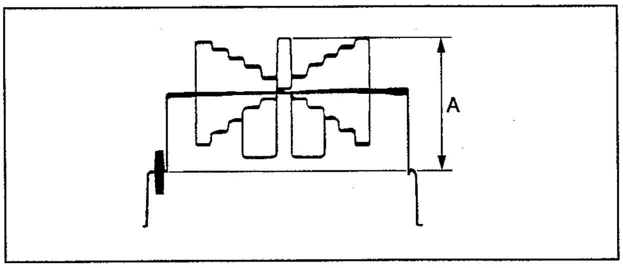
Perform this adjustment, if necessary, to suit the customer's preferences.

Preparation

- On the setup menu, set as follows.
  MENU : PAINT
  PAGE : 07*DETAIL 1
  ITEM : DETAIL → ON

  MENU : PAINT
  PAGE : 03*BLACK/FLARE
  ITEM : TEST OUT SELECT → ENC

  MENU : PAINT
  PAGE : 08*DETAIL 2
  ITEM : KNEE APERTURE → ON
- OUTPUT/DCC switch (inside panel) → CAM/ON
- Shoot a grayscale chart in the full underscanned monitor frame.
  Equipment : Waveform monitor
  Test point : TEST OUT connector
  Setting point : ⊘ Lens IRIS
  Spec. : A = 100 ±2 IRE (NTSC)
  A = 700 ±14 mV (PAL)

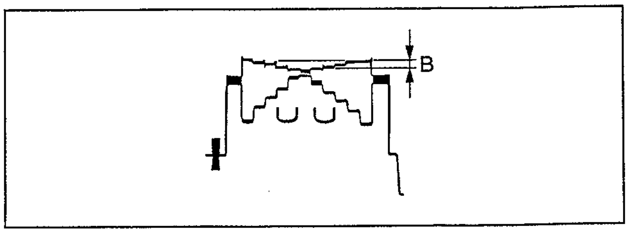


- GAIN switch (inside panel) → M (9 dB)

Adjustment Procedure

Equipment : Waveform monitor
Test point : TEST OUT connector

1. On the setup menu, adjust as follows.
   MENU : PAINT
   PAGE : 08*DETAIL 2
   ITEM : KNEE APT LVL
   Spec. : Adjust the peak-to-peak level of the noise at the third steps from the top (portion B) in the grayscale chart, as desired.



9-15-7. H Detail Black Clip Adjustment

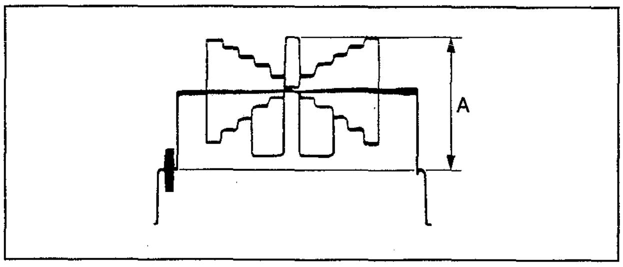
Note

Perform this adjustment, if necessary, to suit the customer's preferences.

Preparation

- On the setup menu, set as follows.
  MENU : PAINT
  PAGE : 01*SW STATUS
  ITEM : DETAIL → ON

  MENU : PAINT
  PAGE : 03*BLACK/FLARE
  ITEM : TEST OUT SELECT → ENC
- OUTPUT/DCC switch (inside panel) → CAM/ON
- Shoot a grayscale chart in the full underscanned monitor frame.
  Equipment : Waveform monitor
  Test point : TEST OUT connector
  Setting point : ⊘ Lens IRIS
  Spec. : Open the lens iris by one step from the reference setting
  A = 100 ±2 IRE (NTSC)
  A = 700 ±14 mV (PAL)

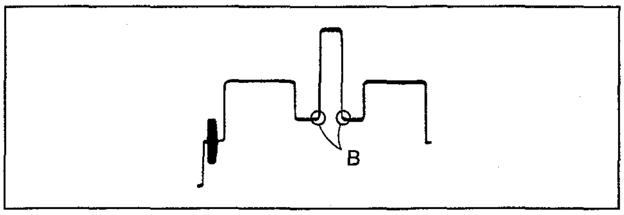


- Select the line at the center white portion of the grayscale chart.

Adjustment Procedure

Equipment : Waveform monitor
Test point : TEST OUT connector

1. On the setup menu, adjust as follows.
   MENU : PAINT
   PAGE : 08*DETAIL 2
   ITEM : DTL BLK LIMIT (Factory setting : 0)
   Spec. : Set the edges of portion B to the desired clip level.



9-15-8. V Detail Black Clip Adjustment

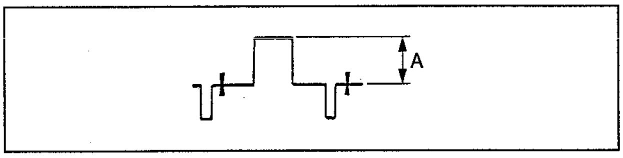
Note

Perform this adjustment, if necessary, to suit the customer's preferences.

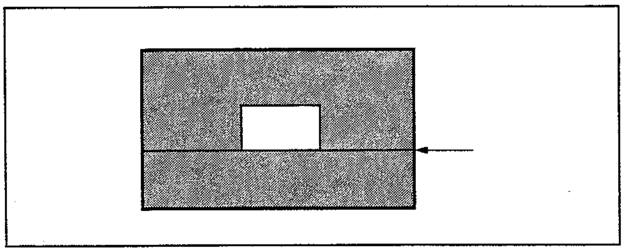
Preparation

- On the setup menu, set as follows.
  MENU : PAINT
  PAGE : 01*SW STATUS
  ITEM : DETAIL → ON

  MENU : PAINT
  PAGE : 03*BLACK/FLARE
  ITEM : TEST OUT SELECT → ENC
- OUTPUT/DCC switch (inside panel) → CAM/ON
- Shoot a white window chart in the full underscanned monitor frame.
  Equipment : Waveform monitor
  Test point : TEST OUT connector
  Setting point : ⊘ Lens IRIS
  Spec. : Open the lens iris by one step from the reference setting
  A = 100 ± 2 IRE (NTSC)
  A = 700 ± 14 mV (PAL)



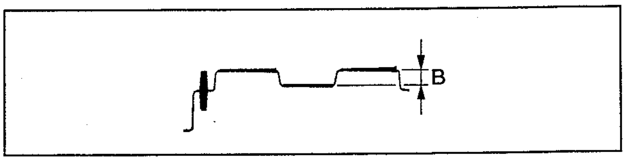
- Select the line at the bottom of the center white portion in the white window chart.



Adjustment Procedure

Equipment : Waveform monitor
Test point : TEST OUT connector

1. On the setup menu, adjust as follows.
   MENU : PAINT
   PAGE : 08*DETAIL 2
   ITEM : DETAIL V-BLK LIM (Factory setting : 0)
   Spec. : Set the level of portion B to the desired level.



9-16. Skin Tone Adjustment

Note

Perform this adjustment, if necessary, to suit the customer's preferences.

Preparation

- On the setup menu, set as follows.
  MENU : PAINT
  PAGE : 10*SKIN DETAIL
  ITEM : SKIN DETAIL ALL → ON
  ITEM : SKIN DETAIL → ON
  ITEM : SKIN AREA IND. → ON
- Shoot a person's face.

Adjustment Procedure

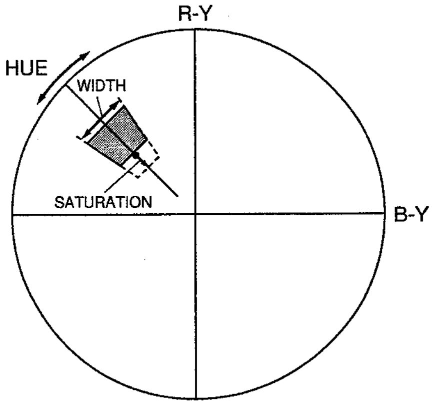
Equipment : Any of color monitor, viewfinder or waveform/vector monitor.
Test point : TEST OUT or VIDEO OUT connector

1. Shoot a person's face in the central of the viewfinder.

2. On the setup menu, set as follows.
   MENU : PAINT
   PAGE : 10*SKIN DETAIL
   ITEM : SKIN DETECT → EXEC

3. Push the rotary encoder.
   (The detection area is displayed in a zebra pattern.)

4. Perform the adjustment in this step, if necessary.
   On the setup menu, adjust as follows.
   MENU : PAINT
   PAGE : 10*SKIN DETAIL
   ITEM : SKIN DTL SAT.
   (Component in the saturation direction)
   SKIN DTL HUE (Hue)
   SKIN DTL WIDTH
   (Component in the chroma phase direction)



The skin detail detection area is displayed in a zebra pattern.
Adjust so that zebra pattern displays only proper area.

5. On the setup menu, adjust as follows.
   MENU : PAINT
   PAGE : 10*SKIN DETAIL
   ITEM : SKIN DETAIL LVL (Factory setting: 0)
   Spec. : Set the level to the desired detail level.

Setting After Adjustment

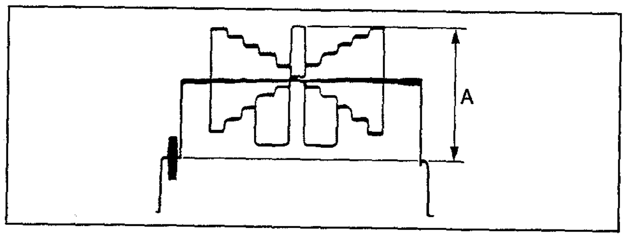
- On the setup menu, set as follows.
  MENU : PAINT
  PAGE : 10*SKIN DETAIL
  ITEM : SKIN DETAIL → OFF
  ITEM : SKIN AREA IND. → OFF
  ITEM : SKIN DETAIL ALL → OFF

9-17. Zebra Adjustment

Preparation

- ZEBRA switch (viewfinder) → ON
- On the setup menu, set as follows.
  MENU : PAINT
  PAGE : 03*BLACK/FLARE
  ITEM : TEST OUT SELECT → R, G or B

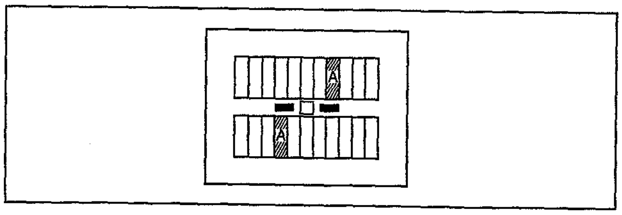
  MENU : OPERATION
  PAGE : 11*VF SETTING
  ITEM : ZEBRA SELECT → 1
  ITEM : ZEBRA 1 APT. LVL → 1%
- OUTPUT/DCC switch (inside panel) → CAM/ON
- Shoot a grayscale chart in the full underscanned monitor frame.
  Equipment : Waveform monitor
  Test point : TEST OUT connector
  Setting point : ⊘ Lens IRIS
  Spec. : A = 100 ± 2 IRE (NTSC)
  A = 700 ± 14 mV (PAL)



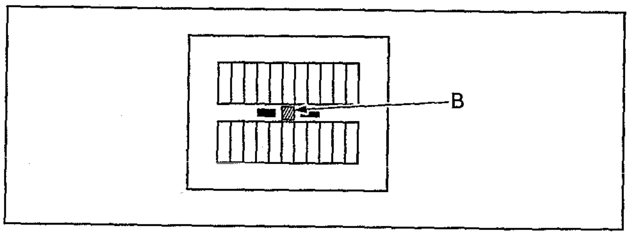
Adjustment Procedure

Equipment : Black and white monitor
Test point : TEST OUT connector

1. On the setup menu, adjust as follows.
   MENU : OPERATION
   PAGE : 11*VF SETTING
   ITEM : ZEBRA 1 DET. LVL
   Spec. : Set the condition that zebra pattern appears at the portions A.



2. On the setup menu, set as follows.
   MENU : PAINT
   PAGE : 01*SW STATUS
   ITEM : TEST SAW → ON
3. On the setup menu, adjust as follows.
   MENU : OPERATION
   PAGE : 11*VF SETTING
   ITEM : ZEBRA 1 APT.LVL
   (Factory setting: 10%)
   Spec. : Adjust for the desired width of detection.
4. On the setup menu, set as follows.
   MENU : PAINT
   PAGE : 01*SW STATUS
   ITEM : TEST SAW → OFF
5. On the setup menu, set as follows.
   MENU : OPERATION
   PAGE : 11*VF SETTING
   ITEM : ZEBRA SELECT → 2
6. On the setup menu, adjust as follows.
   MENU : OPERATION
   PAGE : 11*VF SETTING
   ITEM : ZEBRA 2 DET. LVL
   Spec. : Set the condition that zebra pattern appears at the portion B.



Setting After Adjustment

- On the setup menu, set as follows.
  MENU : OPERATION
  PAGE : 11*VF SETTING
  ITEM : ZEBRA SELECT → 1

  MENU : PAINT
  PAGE : 03*BLACK/FLARE
  ITEM : TEST OUT SELECT → ENC

9-18. Automatic Iris Adjustment

Preparation

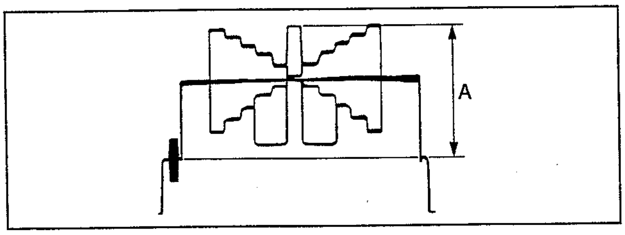
- On the setup menu, set as follows.
  MENU : PAINT
  PAGE : 03∗BLACK/FLARE
  ITEM : TEST OUT SELECT → ENC
- OUTPUT/DCC switch (inside panel) → CAM/ON
- Shoot a grayscale chart in the full underscanned monitor frame.
- Lens IRIS → AUTO

Adjustment Procedure

Equipment : Waveform monitor
Test point : TEST OUT connector

1. On the setup menu, adjust as follows.
   MENU : MAINTENANCE
   PAGE : 12∗AUTO IRIS 2
   ITEM : IRIS APL RATIO
   Spec. : Set depending on the application. (Automatic iris operation mode setting can be done from the average level to peak-to-peak level of the video signal.)
   IRIS APL RATIO = −106 → peak-to-peak level
   IRIS APL RATIO = 92 → average level

2. On the setup menu, adjust as follows.
   MENU : MAINTENANCE
   PAGE : 12∗AUTO IRIS 2
   ITEM : IRIS LEVEL
   Spec. : A = 100 ± 2 IRE (NTSC)
   A = 700 ± 14 mV (PAL)



3. On the setup menu, adjust as follows.
   MENU : MAINTENANCE
   PAGE : 12∗AUTO IRIS 2
   ITEM : IRIS SPEED (Factory setting: 2)
   Spec. : Set to the desired operation speed of auto iris.

4. On the setup menu, set as follows.
   MENU : MAINTENANCE
   PAGE : 12∗AUTO IRIS 2
   ITEM : CLIP HIGH LIGHT → ON or OFF
   Spec. : Set the level to the desired AUTO iris.

Section 10
Electrical Alignment of VTR System

10-1. Preparation

Required Equipment

- Audio analyzer
  Tektronix AA501A (OP.2) or equivalent
- Generator
  Tektronix SG-5010 or equivalent
- Oscilloscope
  Tektronix TDS460A or equivalent
- Digital voltmeter
  Advantest TR6845 or equivalent
- Standard playback machine

Fixtures and Tools

- Alignment tape (MR5-1 : Part No. 8-960-077-01,
  MR5-1P : Part No. 8-960-077-51)
  Alignment tape (MR2-1P : Part No. 8-960-077-61)
- Working tape (BCT-60MX)

Note

Prepare a working tape for electrical adjustment that has been used as few times as possible. A recorded tape can also be used, but a new signal will be recorded on it.

Precautions

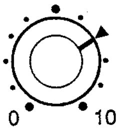
Before starting adjustment of this section, check the product destination that is indicated on the SS-92 board and the setting of the model selection switches (S101-7 : IMX/HDCAM, S101-8 : NTSC/PAL) on the same board. (Refer to “1-10. On-Board Switch Description”)

Initial Position of Switches

Inside panel :
AUDIO IN selector switch CH1, CH2 → REAR
OUTPUT/DCC switch → CAM/ON
Rear panel :
AUDIO IN selector switch CH1, CH2 → LINE
Setup menu (MAINTENANCE menu) :
- 07∗VTR MODE-2
  AU REF LEVEL → −20 dB
  AU REF OUT → 0 dB

AUDIO LEVEL CH1, CH2 Control Knobs Reference Position

Set the control knobs to the inverted triangle (▼) (2 o’clock position).



10-2. Audio System Alignment

10-2-1. CH1 Unity Level Adjustment (for VCA)

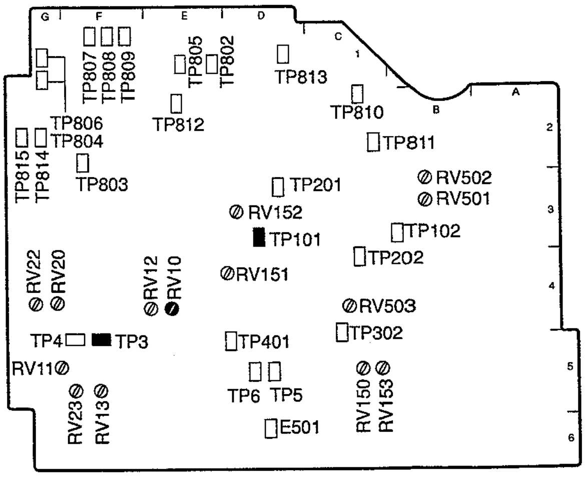
Preparation

- Complete the setting as shown below by using the setup menu.
  MENU : MAINTENANCE
  PAGE : 07∗VTR MODE-2
  ITEM : REAR1/WRR VR SEL → F+S1
  ITEM : REAR2/WRR VR SEL → F+S2
- MIC control knob/front panel → Fully clockwise rotation
- AUDIO LEVEL CH1 control knob/inside panel → Reference position
- AUDIO SELECT switch CH1/inside panel → MANUAL
- Connect sine wave of 1 kHz at +4 dBu to AUDIO IN CH1 connector/rear panel.

Adjustment Procedure

1. Equipment : Audio analyzer
   Measurement point : TP101 (D-3)/FP-121A board (B side)
   Adjustment point : ●RV10 (E-4)/FP-121A board (B side)
   Specifications : −22 ±0.1 dBu

2. Equipment : Audio analyzer
   Measurement point : TP3 (F-4)/FP-121A board (B side)
   Confirm that the audio signal satisfies the specifications of −33 ±1.5 dBu.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RV13
E501
RV150
RV153

FP-121A board (B side)

10-2-2. CH2 Unity Level Adjustment (for VCA)

Preparation

- Complete the setting as shown below by using the setup menu.
  MENU : MAINTENANCE
  PAGE : 07*VTR MODE-2
  ITEM : REAR1/WRR VR SEL → F+S1
  ITEM : REAR2/WRR VR SEL → F+S2
- MIC control knob/front panel → Fully clockwise rotation
- AUDIO LEVEL CH2 control knob/inside panel → Reference position
- AUDIO SELECT switch CH2/inside panel → MANUAL
- Connect sine wave of 1 kHz at +4 dBu to AUDIO IN CH2 connector/rear panel.

Adjustment Procedure

1. Equipment : Audio analyzer
   Measurement point : TP102 (B-3)/FP-121A board (B side)
   Adjustment point : ⊘RV20 (F-4)/FP-121A board (B side)
   Specifications : −22 ±0.1 dBu

2. Equipment : Audio analyzer
   Measurement point : TP4 (F-4)/FP-121A board (B side)
   Confirm that the audio signal satisfies the specifications of −33 ±1.5 dBu.

10-2-3. SIDE VR Voltage Adjustment (for VCA)

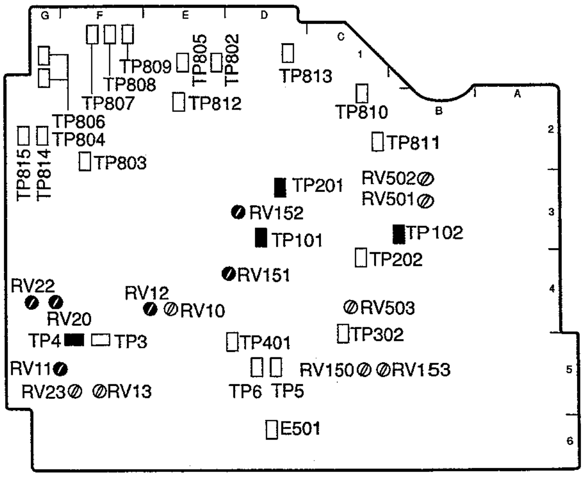
Preparation

- Complete the setting as shown below by using the setup menu.
  MENU : MAINTENANCE
  PAGE : 07*VTR MODE-2
  ITEM : REAR1/WRR VR SEL → SIDE1
  ITEM : REAR2/WRR VR SEL → SIDE2
- AUDIO LEVEL CH1 control knob/inside panel → Reference position
- AUDIO SELECT switch CH1/inside panel → MANUAL
- AUDIO SELECT switch CH2/inside panel → MANUAL
- Connect sine wave of 1 kHz at +4 dBu to AUDIO IN CH1 connector/rear panel.
- Connect sine wave of 1 kHz at +4 dBu to AUDIO IN CH2 connector/rear panel.

Adjustment Procedure

1. Equipment : Audio analyzer
   Measurement point : TP101 (D-3)/FP-121A board (B side)
   Adjustment point : ⊘RV11 (F-5)/FP-121A board (B side)
   Specifications : −22 ±0.1 dBu

2. Equipment : Audio analyzer
   Measurement point : TP201 (C-3)/FP-121A board (B side)
   Confirm that the audio signal satisfies the specifications of −22 ±0.5 dBu.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RV13
TP6
TP5
E501

FP-121A board (B side)

10-2-4. AGC Voltage Adjustment (for VCA)

Preparation

- AUDIO SELECT switch CH1/inside panel → AUTO
- Connect sine wave of 1 kHz at +4 dBu to AUDIO IN CH1 connector/rear panel.

Adjustment Procedure

1. Equipment : Audio analyzer
   Measurement point : TP101 (D-3)/FP-121A board (B side)
   Adjustment point : ⊘RV12 (E-4)/FP-121A board (B side)
   Specifications : −22.0 ±0.1 dBu

2. Equipment : Audio analyzer
   Measurement point : TP201 (C-3)/FP-121A board (B side)
   Confirm that the audio signal satisfies the specifications of −22.0 ±0.1 dBu.

10-2-5. CH1, CH2 Output Level Adjustment (Analog EE)

Preparation

- Complete the setting as shown below by using the setup menu.
  MENU : MAINTENANCE
  PAGE : 07*VTR MODE-2
  ITEM : REAR1/WRR VR SEL → SIDE 1
  ITEM : REAR2/WRR VR SEL → SIDE 2
- AUDIO SELECT switch CH1/inside panel → MANUAL
- AUDIO SELECT switch CH2/inside panel → MANUAL
- AUDIO LEVEL CH1 control knob/inside panel → Reference position
- AUDIO LEVEL CH2 control knob/inside panel → Reference position
- Connect sine wave of 1 kHz at +4 dBu to AUDIO IN CH1 connector/rear panel.
- Connect sine wave of 1 kHz at +4 dBu to AUDIO IN CH2 connector/rear panel.

Adjustment Procedure

1. Equipment : Audio analyzer
   Measurement point : TP101 (D-3)/FP-121A board (B side)
   Confirm that the audio signal satisfies the specifications of −22.0 ±0.1 dBu.

2. Equipment : Audio analyzer
   Measurement point : TP201 (C-3)/FP-121A board (B side)
   Confirm that the audio signal satisfies the specifications of −22.0 ±0.1 dBu.

3. Equipment : Audio analyzer
   Measurement point : AUDIO OUT connector/rear panel
   CH1 (X) : Pin-2
   CH1 (Y) : Pin-3
   GND : Pin-1
   Adjustment point : ⊘RV151 (D-4)/FP-121A board (B side)
   Specifications : 0.0 ±0.1 dBm (600 Ω)

4. Equipment : Audio analyzer
   Measurement point : AUDIO OUT connector/rear panel
   CH2 (X) : Pin-4
   CH2 (Y) : Pin-5
   GND : Pin-1
   Adjustment point : ⊘RV152 (D-3)/FP-121A board (B side)
   Specifications : 0.0 ±0.1 dBm (600 Ω)

10-2-6. CH1, CH2 Distortion Factor Adjustment

Preparation

- Complete the setting as shown below by using the setup menu.
  MENU : MAINTENANCE
  PAGE : 07∗VTR MODE-2
  ITEM : REAR1/WRR VR SEL → SIDE 1
  ITEM : REAR2/WRR VR SEL → SIDE 2
- AUDIO SELECT switch CH1/inside panel → MANUAL
- AUDIO SELECT switch CH2/inside panel → MANUAL
- AUDIO LEVEL CH1 control knob/inside panel → Reference position
- AUDIO LEVEL CH2 control knob/inside panel → Reference position
- Connect sine wave of 1 kHz at +4 dBu to AUDIO IN CH1 connector/rear panel.
- Connect sine wave of 1 kHz at +4 dBu to AUDIO IN CH2 connector/rear panel.

Adjustment Procedure

1. Equipment : Audio analyzer (FFT mode)
   Measurement point : TP101 (D-3)/FP-121A board (B side)
   Confirm that the audio signal satisfies the specifications of −22.0 ±0.1 dBu.

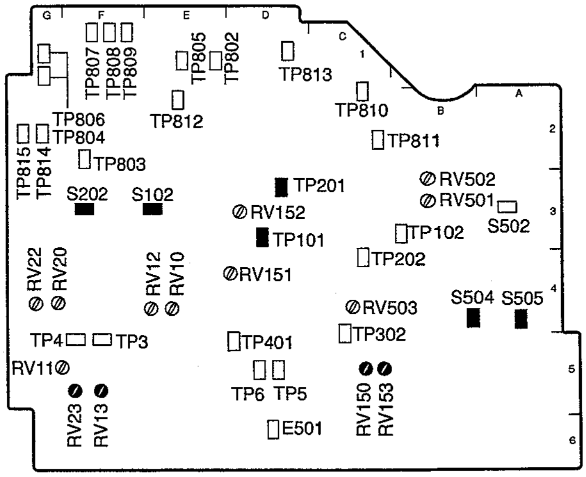
2. Equipment : Audio analyzer (FFT mode)
   Measurement point : TP201 (C-3)/FP-121A board (B side)
   Confirm that the audio signal satisfies the specifications of −22.0 ±0.1 dBu.

3. Connect sine wave of 1 kHz at +10 dBu to AUDIO IN CH1 connector/rear panel.

4. Connect sine wave of 1 kHz at +10 dBu to AUDIO IN CH2 connector/rear panel.

5. Equipment : Audio analyzer (FFT mode)
   Measurement point : AUDIO OUT connector/rear panel
   CH1 (X) : Pin-2
   CH1 (Y) : Pin-3
   GND : Pin-1
   Adjustment point : ⊘RV13 (F-5)/FP-121A board (B side)
   Specifications : Minimum level (better than −85 dBm (600 Ω))

6. Equipment : Audio analyzer (FFT mode)
   Measurement point : AUDIO OUT connector/rear panel
   CH2 (X) : Pin-4
   CH2 (Y) : Pin-5
   GND : Pin-1
   Adjustment point : ⊘RV23 (F-5)/FP-121A board (B side)
   Specifications : Minimum level (better than −85 dBm (600 Ω))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RV153
E501

FP-121A board (B side)

10-2-7. Input Limiter Adjustment

Preparation

- Complete the setting as shown below by using the setup menu.
  MENU : MAINTENANCE
  PAGE : 07*VTR MODE-2
  ITEM : REAR1/WRR VR SEL → SIDE 1
  ITEM : REAR2/WRR VR SEL → SIDE 2
- AUDIO SELECT switch CH1/inside panel → MANUAL
- AUDIO SELECT switch CH2/inside panel → MANUAL
- AUDIO LEVEL CH1 control knob/inside panel → Reference position
- AUDIO LEVEL CH2 control knob/inside panel → Reference position
- S102 (E-3)/FP-121A board (B side) → ON
- S202 (F-3)/FP-121A board (B side) → ON
- S504 (B-4)/FP-121A board (B side) → OFF
- S505 (A-4)/FP-121A board (B side) → OFF
- Connect sine wave of 1 kHz at +4 dBu to AUDIO IN CH1 connector/rear panel.
- Connect sine wave of 1 kHz at +4 dBu to AUDIO IN CH2 connector/rear panel.

Adjustment Procedure

1. Equipment : Audio analyzer
   Measurement point : TP101 (D-3)/FP-121A board (B side)
   Confirm that the audio signal satisfies the specifications of −22.0 ±0.1 dBu.

2. Equipment : Audio analyzer
   Measurement point : TP201 (C-3)/FP-121A board (B side)
   Confirm that the audio signal satisfies the specifications of −22.0 ±0.1 dBu.

3. Connect sine wave of 1 kHz at +24 dBu to AUDIO IN CH1 connector/rear panel.

4. Connect sine wave of 1 kHz at +24 dBu to AUDIO IN CH2 connector/rear panel.

5. Equipment : Audio analyzer
   Measurement point : AUDIO OUT connector/rear panel
   CH1 (X) : Pin-2
   CH1 (Y) : Pin-3
   GND : Pin-1
   Adjustment point : ⊘RV150 (B-5)/FP-121A board (B side)
   Specifications : 9.20 ±0.1 dBm (600 Ω)

6. Equipment : Audio analyzer
   Measurement point : AUDIO OUT connector/rear panel
   CH2 (X) : Pin-4
   CH2 (Y) : Pin-5
   GND : Pin-1
   Adjustment point : ⊘RV153 (B-5)/FP-121A board (B side)
   Specifications : 9.20 ±0.1 dBm (600 Ω)

10-2-8. D/A Output Level Adjustment

Preparation

- Complete the setting as shown below by using the setup menu.
  MENU : MAINTENANCE
  PAGE : 07*VTR MODE-2
  ITEM : AU SG (1 kHz) → ON
- OUTPUT/DCC switch/inside panel → BARS/OFF

Adjustment Procedure

1. Equipment : Audio analyzer
   Measurement point : AUDIO OUT connector/rear panel
   CH1 (X) : Pin-2
   CH1 (Y) : Pin-3
   GND : Pin-1
   Adjustment point : ⊘RV501 (B-3)/FP-121A board (B side)
   Specifications : 0 ±0.1 dBu

2. Equipment : Audio analyzer
   Measurement point : TP102 (B-3)/FP-121A board (B side)
   Confirm that the audio signal satisfies the specifications of −14.5 ±1.0 dBu.

3. Equipment : Audio analyzer
   Measurement point : AUDIO OUT connector/rear panel
   CH2 (X) : Pin-4
   CH2 (Y) : Pin-5
   GND : Pin-1
   Adjustment point : ⊘RV502 (B-3)/FP-121A board (B side)
   Specifications : 0 ±0.1 dBm(600 Ω)

4. Equipment : Audio analyzer
   Measurement point : TP202 (B-3)/FP-121A board (B side)
   Confirm that the audio signal satisfies the specifications of −14.5 ±1.0 dBu

Setting upon Completion of Adjustment

- OUTPUT/DCC switch (inside panel) → CAM/ON
- Complete the setting as shown below by using the setup menu.
  MENU : MAINTENANCE
  PAGE : 07*VTR MODE-2
  ITEM : AU SG (1 kHz) → OFF

10-2-9. CH1, CH2 Output Level Check

Preparation

- Complete the setting as shown below by using the setup menu.
  MENU : MAINTENANCE
  PAGE : 06*VTR MODE-1
  ITEM : AUDIO CH3/4 MODE → SW
- Connect sine wave of 1 kHz at +4 dBu to AUDIO IN CH1 connector/rear panel.
- Connect sine wave of 1 kHz at +4 dBu to AUDIO IN CH2 connector/rear panel.

Adjustment Procedure

1. Equipment : Audio analyzer
   Measurement point : TP302 (C-5)/FP-121A board (B side)
   Confirm that the audio signal satisfies the specifications of −22.0 ±0.5 dBu.

2. Equipment : Audio analyzer
   Measurement point : AUDIO OUT connector/rear panel
   CH1 (X) : Pin-2
   CH1 (Y) : Pin-3
   GND : Pin-1
   Confirm that the audio signal satisfies the specifications of 0 ±1 dBm (600 Ω).

3. Equipment : Audio analyzer
   Measurement point : TP401 (D-5)/FP-121A board (B side)
   Confirm that the audio signal satisfies the specifications of −22.0 ±0.5 dBu.

4. Equipment : Audio analyzer
   Measurement point : AUDIO OUT connector/rear panel
   CH2 (X) : Pin-4
   CH2 (Y) : Pin-5
   GND : Pin-1
   Confirm that the audio signal satisfies the specifications of 0 ±1 dBm (600 Ω).

10-2-10. Output Limiter Check

Preparation

- Complete the setting as shown below by using the setup menu.
  MENU : MAINTENANCE
  PAGE : 07*VTR MODE-2
  ITEM : REAR1/WRR VR SEL → SIDE 1
  ITEM : REAR2/WRR VR SEL → SIDE 2
- AUDIO SELECT switch CH1/inside panel → MANUAL
- AUDIO SELECT switch CH2/inside panel → MANUAL
- AUDIO LEVEL CH1 control knob/inside panel → Reference position
- AUDIO LEVEL CH2 control knob/inside panel → Reference position
- S102 (E-3)/FP-121A board (B side) → OFF
- S202 (F-3)/FP-121A board (B side) → OFF
- S504 (B-4)/FP-121A board (B side) → ON
- S505 (A-4)/FP-121A board (B side) → ON
- Connect sine wave of 1 kHz at +4 dBu to AUDIO IN CH1 connector/rear panel.
- Connect sine wave of 1 kHz at +4 dBu to AUDIO IN CH2 connector/rear panel.

Adjustment Procedure

1. Equipment : Audio analyzer
   Measurement point : TP101 (D-3)/FP-121A board (B side)
   Confirm that the audio signal satisfies the specifications of −22.0 ±0.1 dBu.

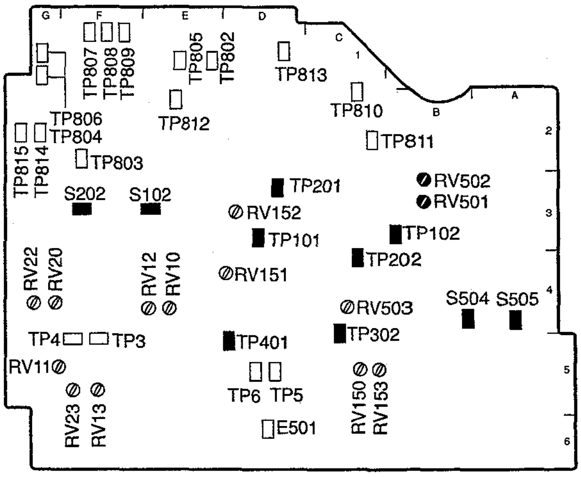
2. Equipment : Audio analyzer
   Measurement point : TP201 (C-3)/FP-121A board (B side)
   Confirm that the audio signal satisfies the specifications of −22.0 ±0.1 dBu.

3. Connect sine wave of 1 kHz at +24 dBu to AUDIO IN CH1 connector/rear panel.

4. Connect sine wave of 1 kHz at +24 dBu to AUDIO IN CH2 connector/rear panel.

5. Equipment : Audio analyzer
   Measurement point : AUDIO OUT connector/rear panel
   CH1 (X) : Pin-2
   CH1 (Y) : Pin-3
   GND : Pin-1
   Confirm that the audio signal satisfies the specifications of +9.0 ±0.5 dBm (600 Ω).

6. Equipment : Audio analyzer
   Measurement point : AUDIO OUT connector/rear panel
   CH2 (X) : Pin-4
   CH2 (Y) : Pin-5
   GND : Pin-1
   Confirm that the audio signal satisfies the specifications of +9.0 ±0.5 dBm (600 Ω).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FP-121A board (B side)

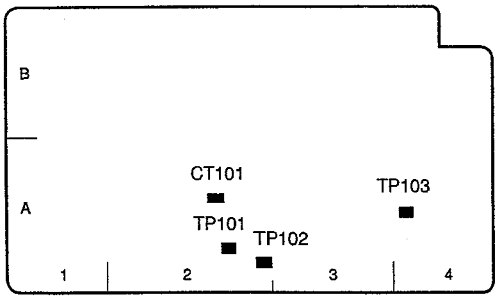
10-3. System Control Alignment

10-3-1. Battery Voltage Correction Adjustment

This adjustment supplies accurate +12 V power voltage to the DC IN connector. The Battery Voltage Correction Adjustment is required when the FP-121A board is replaced.

Adjustment Procedure

1. Set the switch S1-1/AT-143 board to the ON position.
2. Set the MENU ON/OFF switch on the inside panel to the ON position to start up the maintenance mode.
3. Select "A90 : BATTERY CORRECTION". The message "FEED ACCURATE DC +12V, PUSH RE TO ADJUST" appears.
4. Press the rotary encoder to start adjustment.
5. When adjustment is complete, the message "COMPLETE" appears.



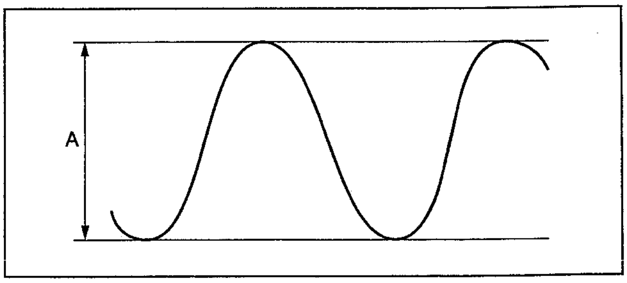
CCM-45 board (A side)

10-3-2. Antenna Tuning Frequency Adjustment (Tele-File)

Adjustment Procedure

Notes
- The adjustment frequency is 13.56 MHz.
- Set the oscilloscope Filter and Bandwidth Limiter to OFF. Check that the oscilloscope probe is already calibrated.

1. Insert a cassette on which the memory label is attached.
2. Connect TP103 with the frame chassis (metallic part) of the unit with a shorting clip.
3. Equipment : Oscilloscope
   Measurement point : TP101 (A-2)/CCM-45 board
   Adjustment point : CT101 (A-2)/CCM-45 board
   Specifications : A = Maximum amplitude
   (9 Vp-p or more)



4 Equipment : Oscilloscope
Measurement point : TP102 (A-2)/CCM-45 board
Specifications : $A \geqq 9$ Vp-p

10-4. Servo System Alignment

All adjustments of the servo system are performed using the adjustment menu of the maintenance mode.
The data obtained by adjustment is automatically saved in the servo system EEPROM (IC403/MDC-13A board).

Note

Before starting the servo system adjustment, be sure to set the VTR SAVE/STBY switch on the inside panel to the STBY position.

When an adjustment fails

When an adjustment fails, the message "INCOMPLETE" appears on the menu display. The following two causes are possible.

- The adjustment itself has not completed to its end.
- The adjustment ended successfully but the data failed to be saved in the servo system EEPROM.
  To determine which of the above two causes applies, execute "A000 : NV-RAM INITIALIZE". If this ends with the message "INCOMPLETE", communication with the servo system EEPROM may have an error.
  For details of how to execute "A000 : NV-RAM INITIALIZE", refer to Section 10-4-1.

Adjustment items	Menu display
10-4-1. Servo System Adjustment Data Initialization	A000 : NV-RAM INITIALIZE
10-4-2. Capstan FG Duty Ratio Adjustment	A001 : CAPSTAN FG DUTY
10-4-3. Capstan Add-On Recording Adjustment	A002 : CAPSTAN DELAY
10-4-4. Drum Phase Adjustment	A003 : DRUM PHASE

Note

For the procedure of starting up the maintenance mode, refer to Section 11-2-2.

10-4-1. Servo System Adjustment Data Initialization

When the servo system EEPROM (IC403/MDC-13A board) is replaced, the servo adjustment data must be initialized as follows.

Note

Be sure to turn off the main power upon completion of the servo system adjustment data initialization Then turn the main power back on and perform all of the adjustments shown in Sections 10-4-2 through 10-4-4.

Adjustment Procedure

1. Set the switch S1-1/AT-143 board to the ON position.
2. Set the MENU ON/OFF switch on the inside panel to the ON position to start up the maintenance mode.
3. Select "A000 : NV-RAM INITIALIZE". The message "PUSH RE TO INITIALIZE" appears.
4. Press the rotary encoder to start initialization.
   The message "NOW INITIALIZING ..." appears while the initialization is in progress.
5. When initialization ends successfully, the message "COMPLETE" appears.
6. Turn off the main power once.

When the adjustment fails

When the initialization fails, the message "INCOMPLETE" appears.
Check the following possible causes.

- IC403/MDC-13A board is defective.
- Communication between the MDC-13A board and the SS-92 board is defective.

10-4-2. Capstan FG Duty Ratio Adjustment

Adjustment Procedure

1. Set the switch S1-1/AT-143 board to the ON position.
2. Set the MENU ON/OFF switch on the inside panel to the ON position to start up the maintenance mode.
3. Select "A001 : CAPSTAN FG DUTY". The message "PUSH RE TO ADJUST" appears.
4. Press the rotary encoder to start adjustment. The message "NOW ADJUSTING ..." appears while the adjustment is in progress.
5. When adjustment ends successfully, the message "COMPLETE" appears. The adjustment data is automatically saved in the servo system EEPROM (IC403/MDC-13A board).

When the adjustment fails

When the adjustment fails, the message "INCOMPLETE" appears.

Check the following possible causes.

- MCD-13A board capstan FG amplifier or capstan motor driver circuit is defective.
- SS-92 board capstan drive output signal or duty ratio adjustment output signal is abnormal.
- Capstan motor is defective.

10-4-3. Capstan Add-On Recording Adjustment

A working tape is required for this adjustment. Use the center position, which is at about 25 to 30 minutes of a BCT-60MX cassette tape.

Note

You can check that a working tape is at about the 30-minute position as follows:

- The 6 black square indicators " ■ " turn on in the remaining tape indication area on the display window/ inside panel.
- The message "30-25" appears in the remaining tape indication area on VF.

Adjustment Procedure

1. Cue up a working tape to about the 30-minute position.
2. Eject the working tape.
3. Set the switch S1-1/AT-143 board to the ON position.
4. Set the MENU ON/OFF switch on the inside panel to the ON position to start up the maintenance mode.
5. Select "A002: CAPSTAN DELAY". The message "INSERT WORK TAPE" appears.
6. Insert a working tape (that has already been cued up to about the 30-minute position.)
7. When the working tape is inserted, the adjustment starts automatically. The message "NOW ADJUSTING ..." appears while the adjustment is in progress.
8. When adjustment ends successfully, the message "COMPLETE" appears. The adjustment data is automatically saved in the servo system EEPROM (IC403/MDC-13A board).
9. The working tape is ejected automatically.

When the adjustment fails

When the adjustment fails, the message "INCOMPLETE" appears and the working tape is ejected automatically. Check the following possible causes and repeat this adjustment again.

- Tape run is abnormal or the tape is damaged.
- Tension of the timing belt needs adjustment.

Note

Refer to the following sections for adjusting the tension of the timing belt.

8-1-3. FWD Holdback Tension Adjustment

8-1-4. REV Holdback Tension Adjustment

8-1-5. Timing Belt Tension Adjustment

10-4-4. Drum Phase Adjustment

The alignment tape (MR2-1P : Part No. 8-960-077-61) is required for this adjustment. The alignment tape (MR2-1P) is used at the position of 00 : 01 : 00 : 00 to 00 : 10 : 00 : 00.

Note

Be sure to use the specified alignment tape. If any tape other than the specified alignment tape is used for this adjustment, the correct drum phase cannot be obtained even though "COMPLETE" appears upon completion of adjustment.

Adjustment Procedure

1. Cue up the alignment tape (MR2-1P) to the position of 00 : 01 : 00 : 00.
2. Eject the alignment tape.
3. Set the switch S1-1/AT-143 board to the ON position.
4. Set the MENU ON/OFF switch on the inside panel to the ON position to start up the maintenance mode.
5. Select "A003 : DRUM PHASE".
   The message "PUSH RE TO ADJUST" appears.
6. Press the rotary encoder.
   The message "INSERT MR2-1P" appears.
7. Insert the alignment tape (MR2-1P) that has been already cued up to the position of 00 : 01 : 00 : 00.
8. When the alignment tape is inserted, the adjustment starts automatically.
   The message "NOW ADJUSTING ..." appears while the adjustment is in progress.
9. When adjustment ends successfully, the message "COMPLETE" appears. The adjustment data is automatically saved in the servo system EEPROM (IC403/MDC-13A board).
10. The alignment tape is ejected automatically.

When the adjustment fails

When the adjustment fails, the message "INCOMPLETE" appears and the alignment tape is ejected automatically. Check the following possible causes and repeat this adjustment again.

- The alignment tape (MR2-1P) is not cued up to the correct position of 00 : 01 : 00 : 00.
- Tape running is abnormal during playback mode.
- IC303/MDC-13A board is defective.
- Signal circuit between MDC-13A board and the SS-92 board is defective.
- Signal circuit between EQ-88 board and the MDR-14 board is defective.
- Signal circuit between MDC-13A board and the MDR-14 board is defective.
- Drum motor unit is defective.

10-5. RF System Alignment

All adjustments of the RF system are performed using the adjustment menu of the maintenance mode.

Adjustment items	Menu display
10-5-1. RF System Continuous Automatic Adjustment	A17 : A11 - A16 ALL ADJUST
10-5-2. Saving the RF System Adjustment Data	A1F : NV-RAM CONTROL
10-5-3. PB Channel Condition Check	C11 : PB CH CONDITION
10-5-4. REC Channel Condition Check	C12 : REC CH CONDITION

10-5-1. RF System Continuous Automatic Adjustment

When this adjustment is once initiated, the following adjustments are performed automatically in the order shown below.

1. Playback PLL circuit VCO free-run frequency adjustment during playback mode (A13 : PLAY PLL)
2. RF signal A/D conversion gain adjustment (A16 : A/D GAIN)
3. Playback level of PB heads and playback equalizer circuit gain/phase adjustment (A11 : EQUALIZER)
4. Playback PLL circuit VCO free-run frequency adjustment in FWD mode (A14 : FWD PLL)
5. Playback PLL circuit VCO free-run frequency adjustment in REV mode (A15 : REV PLL)
6. Record current/record frequency response adjustment of recording heads (A12 : REC CURRENT)

Note

For the above adjustment items 1 through 5, be sure to use the alignment tape (MR5-1 : Part No. 8-960-077-01 or MR5-1P : Part No. 8-960-077-51).

For the adjustment item 6, use a working tape (BCT-60MX).

The correct adjustment cannot be executed if a tape other than the specified tape is used for adjustment.

Adjustment Procedure

1. Set the switch S1-1/AT-143 board to the ON position.
2. Insert the alignment tape (MR5-1/1P) and rewind the alignment tape to the tape top.
3. Set the MENU ON/OFF switch on the inside panel to the ON position to start up the maintenance mode.
4. Select "A17 : A11-A16 ALL ADJUST". The message "PUSH RE TO ADJUST" appears.
5. Press the rotary encoder and the playback system adjustment is started automatically.
   The message "NOW ADJUSTING ..." appears while the adjustment is in progress.
6. When playback system adjustment ends successfully, the message "SET WORK TAPE FOR REC CURRENT ADJUSTMENT" appears. The alignment tape is ejected automatically.

   Note

   The playback system alignment takes about 3 to 4 minutes.

7. When a working tape is inserted, the record system adjustment starts automatically.
8. When the record system adjustment ends with success, the message "AUTO ADJUST COMPLETE" appears. The recording system adjustment takes about 4 to 5 minutes.

When the adjustment fails

When the adjustment fails, the message "INCOMPLETE" appears and the alignment is halted automatically at the instance when an error occurs. The subsequent adjustment items are not executed.
When the adjustment fails, check the followings in the order shown below.

1. Check if the alignment tape is MR5-1/1P or not.
2. If the unit is not cleaned, perform cleaning with the use of a cleaning tape as described below and perform the adjustment again.

a) Perform cleaning with the use of a cleaning tape and repeat the above adjustment again.
   → When no abnormality is found, this is the end of the adjustment.

b) Perform cleaning with the use of a cleaning tape again and repeat the above adjustment.
   → When no abnormality is found, this is the end of the adjustment.

c) Perform cleaning with the use of a cleaning cloth (refer to Section 2-1) and repeat the above adjustment again.
   → When no abnormality is found, this is the end of the adjustment.

   If the adjustment fails still, check the following possible causes.

   - Defective adjustment of the servo system, or servo circuit is defective.
   - The playback heads inside the drum assembly were worn out.
   - Defective adjustment of tape run system, or part mounting is defective.
   - EQ-88 board is defective.
   - Drum assembly is defective.
   - Drum/slip ring assembly is defective or its mounting is defective.
   - Connection of the flexible board (between the MDR-14 board and the EQ-88 board) is defective.

10-5-2. Saving the RF System Adjustment Data

Note

If the automatic adjustment has not ended with success, do not save the adjustment data.

Adjustment Procedure

1. Select "A1F : NV-RAM CONTROL".
2. Rotate the rotary encoder to move the cursor to "SAVE ALL ADJUSTMENT DATA".
3. Press the rotary encoder to start saving the data. The message "NOW SAVING ...." appears while saving is in progress.
4. When saving the data ends successfully, the message "COMPLETE" appears.

10-5-3. PB Channel Condition Check

This adjustment requires the alignment tape (MR5-1 : Part No. 8-960-077-01 or MR5-1P : Part No. 8-960-077-51). Use the segment of the alignment tape, that has the continuous recording of 2 minutes or longer.

Check Procedure

1. Set the switch S1-1/AT-143 board to the ON position.
2. Insert the alignment tape (MR5-1/1P).
3. Set the MENU ON/OFF switch on the inside panel to the ON position to start up the maintenance mode.
4. Select "C11 : PB CH CONDITION". The message "PUSH RE TO ADJUST" appears.
5. Move the cursor to "ALL" and press the rotary encoder to start checking.
   The message "NOW CHECKING ..." appears while the checking is in progress.
6. All channels are checked starting from A-CH in this order.
7. When the check ends successfully, the message "GRN" appears in the right of "ALL".

When the check fails

When the check fails, the message "CONDITION NG" appears.
When the check fails, perform the check again in the following order shown below.

1. Change the playback position of the alignment and perform the check again.
   → When no abnormality is found, this is the end of the check.
2. Perform cleaning with the use of a cleaning tape and repeat the above check.
   → When no abnormality is found, this is the end of the check.
3. Perform cleaning with the use of a cleaning tape again and repeat the above check.
   → When no abnormality is found, this is the end of the check.
4. Perform cleaning with the use of a cleaning cloth (refer to Section 2-1) and repeat the above adjustment again.
   → When no abnormality is found, this is the end of the check.
   If the check fails still, check the following possible causes.
   - Defective adjustment of the servo system, or servo circuit is defective.
   - Defective adjustment of the RF playback system.
   - The playback heads inside the drum assembly were worn out.
   - Defective adjustment of tape run system, or part mounting is defective.
   - EQ-88 board is defective.
   - Drum assembly is defective.

10-5-4. REC Channel Condition Check

This adjustment requires a working tape (BCT-60MX).

Check Procedure

1. Set the switch S1-1/AT-143 board to the ON position.
2. Insert a working tape.
3. Set the MENU ON/OFF switch on the inside panel to the ON position to start up the maintenance mode.
4. Select "C12 : REC CH CONDITION". The message "PUSH RE TO ADJUST" appears.
5. Move the cursor to "ALL" and press the rotary encoder to start checking.
   The message "NOW CHECKING ..." appears while the checking is in progress.
6. All channels are checked starting from A-CH in this order.
7. When the check ends successfully, the message "GRN" appears in the right of "ALL".

When the check fails

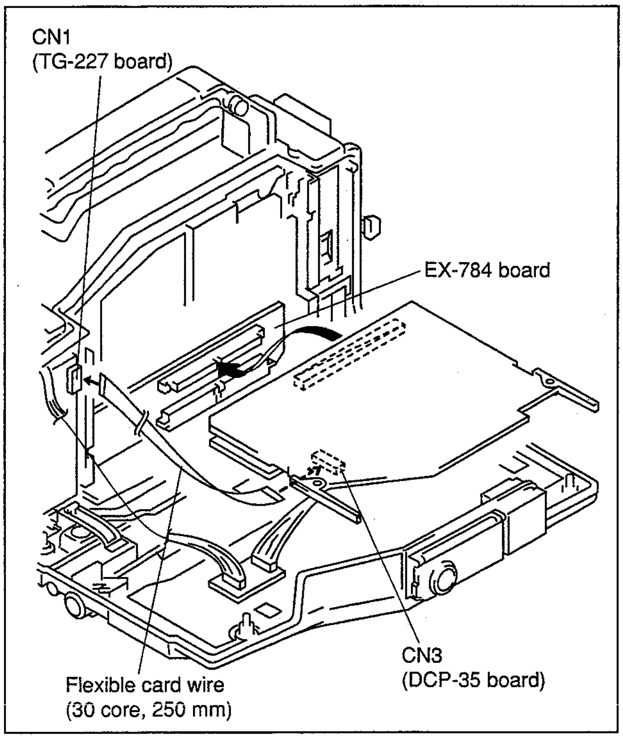
When the check fails, the message "CONDITION NG" appears.
When the check fails, perform the check again in the following order shown below.

1. Refer to "10-5-3. PB Channel Condition Check" using the alignment tape (MR5-1/1P).
   If any abnormality is found, follow the instructions described in the paragraph "When the check fails" of Section 10-5-3.
   When no abnormality is found, proceed to step 2.
2. Perform cleaning with the use of a cleaning tape and repeat Section 10-5-4 using a working tape.
   → When no abnormality is found, this is the end of the check.
3. Perform cleaning with the use of a cleaning tape again and repeat the above check.
   → When no abnormality is found, this is the end of the check.
4. Perform cleaning with the use of a cleaning cloth (refer to Section 2-1) and repeat the above adjustment again.
   → When no abnormality is found, this is the end of the check.
   If the check fails still, check the following possible causes.
   - Defective adjustment of the servo system, or servo circuit is defective.
   - The playback heads inside the drum assembly were worn out.
   - Defective adjustment of tape run system, or part mounting is defective.
   - EQ-88 board is defective.
   - Drum assembly is defective.

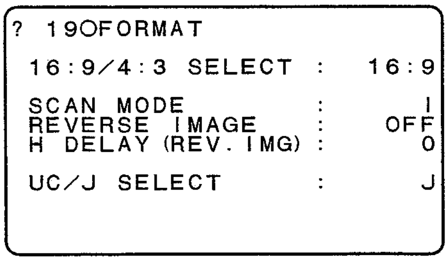
10-6. MSDW-904 (IV-55) Adjustment

Preparation

- Remove the DCP-35 board from the MB-898 board. Connect the EX-784 board to the MB-898 board. Then connect the CN1/TG-227 board and the CN3/DCP-35 board with the flexible card wire (30P, 250 mm).



- Assign the REC VIDEO SOURCE to the ASSIGN switch/inside panel.
- For NTSC, complete the setting as shown below by using the setup menu.
  MENU : OPERATION
  PAGE : 19*FORMAT
  ITEM : UC/J SELECT → J



```
? 19OFORMAT

 16:9/4:3 SELECT   :   16:9

 SCAN MODE         :      I
 REVERSE IMAGE     :    OFF
 H DELAY (REV. IMG) :     0

 UC/J SELECT       :      J
```

Equipments/Fixtures

- Signal generator
  Tektronix TG-2000 or equivalent
- Signal measuring equipment
  Tektronix VM700A or equivalent
- Oscilloscope
  Tektronix TDS3054 or equivalent
- Color Monitor
  Sony BVM-2051 or equivalent
- Extension board
  EX-784 : A-8327-453-A
- Flexible card wire for extension
  Flexible card wire (30P, 250 mm) : 1-757-490-11

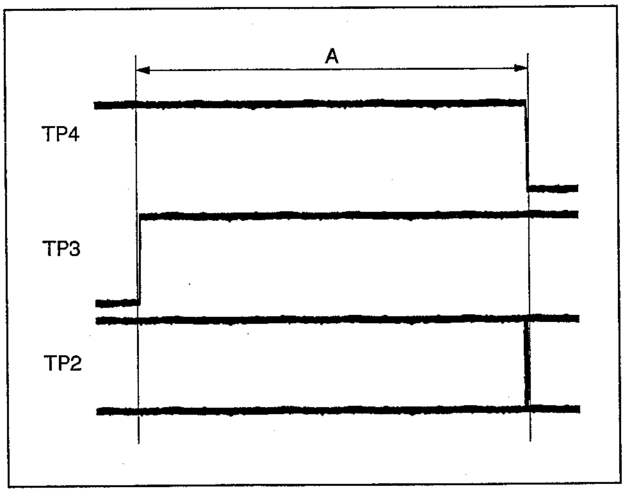
10-6-1. CF Adjustment

Preparation

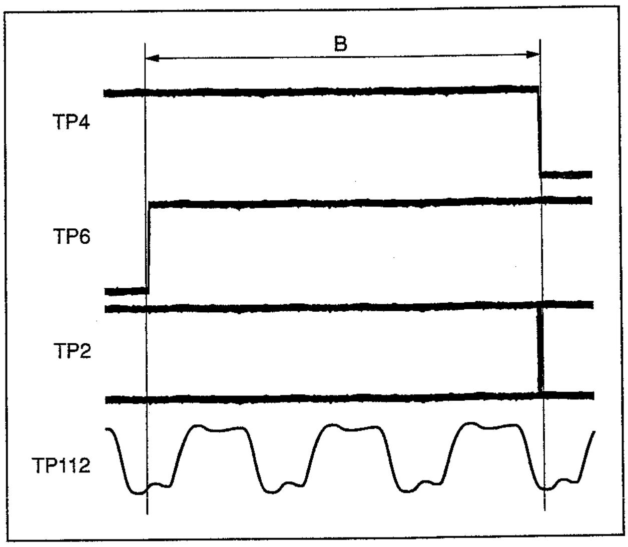
- ASSIGN2 switch/inside panel
  → EXT-VIDEO (In the direction of the arrow)
- For NTSC, connect 75 % color bar signal (100/0/75/0) to the GENLOCK connector/outside panel.
  For PAL, connect 100 % color bar signal (100/0/100/0) to the GENLOCK connector/outside panel.

Adjustment Procedure

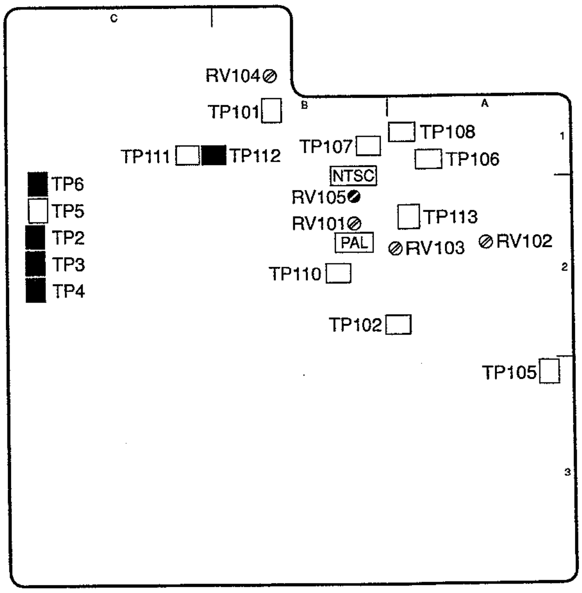
1. Equipment : Oscilloscope
   Measurement points : TP4 (C-2)/IV-55 board (B side)
   TP3 (C-2)/IV-55 board (B side)
   TP2 (C-2)/IV-55 board (B side)
   TP6 (C-2)/IV-55 board (B side)
   Trigger : Triggered by falldown edge of TP4 signal.
   Adjustment point : ⊘RV105 (B-2)/IV-55 board (B side) (NTSC)
   ⊘RV101 (B-2)/IV-55 board (B side) (PAL)
   Specifications : A = 1960 ns (NTSC)
   A = 1580 ns (PAL)


A
TP4
TP3
TP2

2. Measurement points : TP4 (C-2)/IV-55 board (B side)
   TP3 (C-2)/IV-55 board (B side)
   TP2 (C-2)/IV-55 board (B side)
   TP6 (C-2)/IV-55 board (B side)
   TP112 (C-1)/IV-55 board (B side)
   Adjustment point : ⊘RV105 (B-2)/IV-55 board (B side) (NTSC)
   ⊘RV101 (B-2)/IV-55 board (B side) (PAL)
   Specifications : B = 1980 ns (NTSC)
   B = 1600 ns (PAL)
   The riseup edge of TP6 signal should be locked in the center of the 8Fs clock (TP112) bottom.
   Reconfirm the specification of step1.


B
TP4
TP6
TP2
TP112

3. Disconnect the probe from TP6 and connect it to TP2.
   Make sure that signal of TP2 (SFTP) toggles between ON and OFF at the cycle of four field periods.


C
B
A
1
2
3
RV104⊘
TP101
TP111
TP112
TP107
TP108
TP106
NTSC
RV105⊘
RV101⊘
PAL
TP113
⊘RV103
⊘RV102
TP110
TP102
TP105
TP6
TP5
TP2
TP3
TP4

IV-55 board (B side)

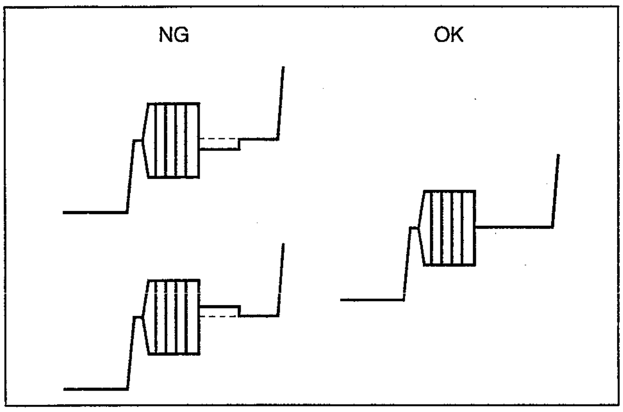
10-6-2. Pedestal Level Adjustment

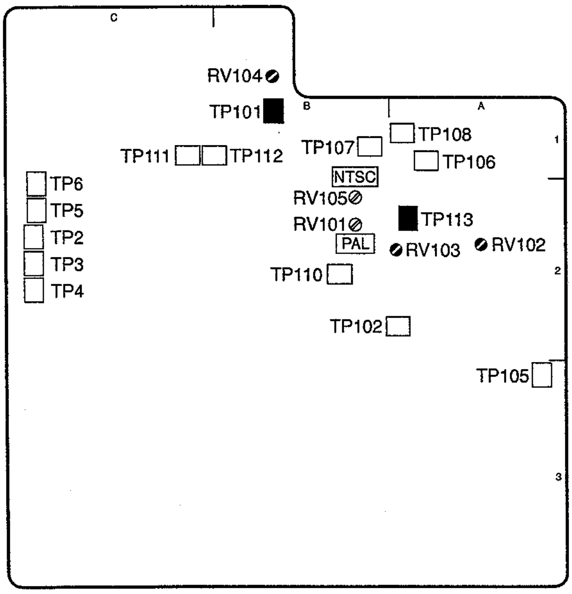
Preparation

- ASSIGN2 switch/inside panel
  → EXT-VIDEO (In the direction of the arrow)
- For NTSC, connect 75 % color bar signal (100/0/75/0) to the GENLOCK connector/outside panel.
  For PAL, connect 100 % color bar signal (100/0/100/0) to the GENLOCK connector/outside panel.

Adjustment Procedure

1. Equipment : Oscilloscope
   Measurement point : TP101 (B-1)/IV-55 board (B side)
   Adjustment point : ⊘RV104 (B-1)/IV-55 board (B side)
   Specifications : Magnify the color burst position on the oscilloscope (100 mV/μs) and adjust the waveform so that there is no steps in amplitude during backporch.





IV-55 board (B side)

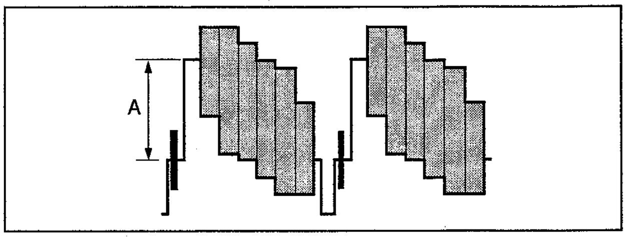
10-6-3. Video Level, Clamp Error Adjustment

Preparation

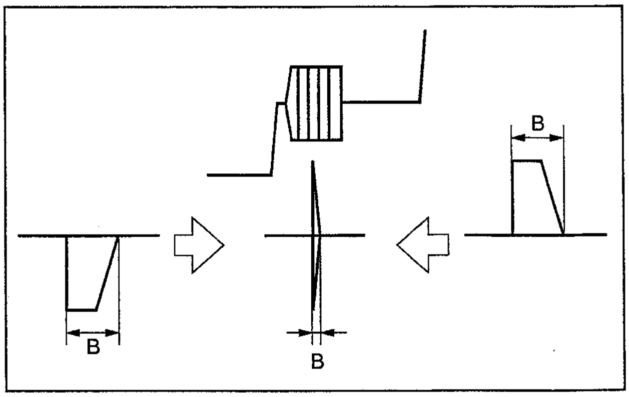
- ASSIGN2 switch/inside panel
  → EXT-VIDEO (In the direction of the arrow)
- For NTSC, connect 75 % color bar signal (100/0/75/0) to the GENLOCK connector/outside panel.
  For PAL, connect 100 % color bar signal (100/0/100/0) to the GENLOCK connector/outside panel.
- Setting of VM700A → Measure COLOR BAR

Adjustment Procedure

1. Coarse adjust of White level
   Measurement point : Output of the VM700A
   Adjustment point : ⊘RV102 (A-2)/IV-55 board (B side)
   Specifications : A = 714 mV (710 to 720 mV) (NTSC)
   A = 700 mV (695 to 705 mV) (PAL)



2. Clamp error adjustment
   Measurement point : TP113 (A-2)/IV-55 board (B side)
   Trigger : Triggered by falldown edge of TP101 signal.
   Adjustment point : ⊘RV103 (A-2)/IV-55 board (B side)
   Specifications : B = Minimum
   Pulse should appear up and down alternately.



3. Fine adjust of White level
   Adjustment point : ⊘RV102 (A-2)/IV-55 board (B side)
   Specifications : 714 mV ±5 mV (NTSC)
   700 mV ±5 mV (PAL)

Section 11
VTR Maintenance Mode

11-1. Introduction

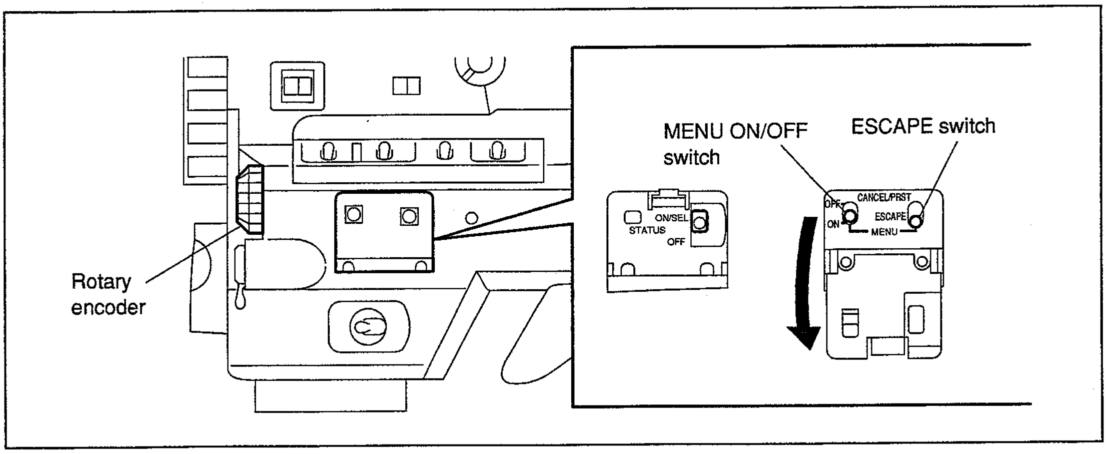
The VTR maintenance mode of the MSW-900/900P is for maintenance and diagnosis, and consists of the top menu and submenus. The menu structure of the VTR maintenance mode is shown below.
The respective menu contents are displayed on the viewfinder of this unit and on the video monitor connected to the TEST OUT connector of the unit.

Menu Structure of VTR Maintenance Mode

- S9 : VTR MAINTE
  - C0 : SERVO CHECK
    - C00-03 : SERVO CHECK
      - C00 : INPUT CHECK
        - C000 : CASSETTE SW
        - C001 : CASSETTE COMP. SW
        - C002 : TAPE T/E SENSOR
        - C003 : HUMID SENSOR
        - C004 : DRUM/CAP MOTOR STS
        - C005 : FUNCTION CAM POS
      - C01 : FUNCTION CAM CHECK
      - C02 : MOTOR SERVO & FG CHECK
      - C03 : SLACK CHECK
  - C1 : RF CHECK
    - C11 : PB CH CONDITION
    - C12 : REC CH CONDITION
  - A0 : SERVO ADJUST
    - A00 : SERVO ADJUST
      - A000 : NV-RAM INITIALIZE
      - A001 : CAPSTAN FG DUTY
      - A002 : CAPSTAN DELAY
      - A003 : DRUM PHASE
  - A1 : RF ADJUST
    - A11 : EQUALIZER
    - A12 : REC CURRENT
    - A13 : PLAY PLL
    - A14 : FWD PLL
    - A15 : REV PLL
    - A16 : A/D GAIN
    - A17 : A11-A16 ALL ADJUST
    - A1F : NV-RAM CONTROL
  - A4 : MECHANISM ADJUST
    - A40 : PATH MODE SEL
    - A41 : DRUM PHASE
  - A9 : OTHERS ADJUST
    - A90 : BATTERY CORRECTION
    - A91 : MDC-13A BOARD CHANGE

11-2. Operation Procedure

11-2-1. Identifying Switches



MENU ON/OFF switch

Use this switch to turn the VTR maintenance menu on and off. When the lid is closed, the switch is set in the OFF position.

ON : The VTR maintenance menu is shown on the display.

OFF : The VTR maintenance menu is not shown on the display.

ESCAPE switch

Use this switch to return to the previous display.

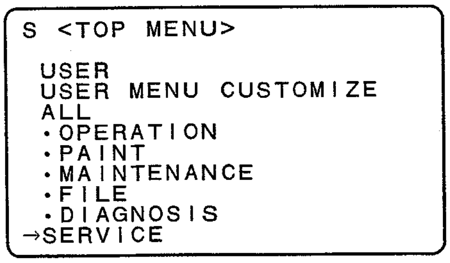
Rotary encoder

Rotate : Rotate the rotary encoder to move the cursor in the direction of the arrow (→) to select the desired item.

Press : Press the rotary encoder to set the selected item.

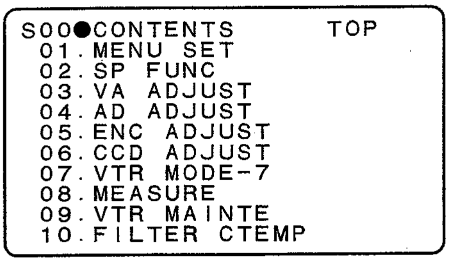
11-2-2. How to Enter VTR Maintenance Mode

1. Set the switch S1-1/AT-143 board to the ON position.
2. Set the MENU ON/OFF switch on the inside panel to the ON position to start up the maintenance mode.
3. The TOP MENU display appears.
4. Select SERVICE and press the rotary encoder.



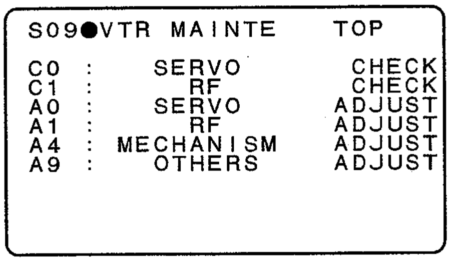
```
S <TOP MENU>

  USER
  USER MENU CUSTOMIZE
  ALL
  •OPERATION
  •PAINT
  •MAINTENANCE
  •FILE
  •DIAGNOSIS
→SERVICE
```

5. The SERVICE display appears.



```
S00●CONTENTS          TOP
 01.MENU SET
 02.SP FUNC
 03.VA ADJUST
 04.AD ADJUST
 05.ENC ADJUST
 06.CCD ADJUST
 07.VTR MODE-7
 08.MEASURE
 09.VTR MAINTE
 10.FILTER CTEMP
```

6. Select S09 VTR MAINTE and press the rotary encoder.
7. The top menu of the VTR MAINTE appears.



```
S09●VTR MAINTE     TOP

C0 :    SERVO      CHECK
C1 :      RF       CHECK
A0 :    SERVO     ADJUST
A1 :      RF      ADJUST
A4 :  MECHANISM   ADJUST
A9 :    OTHERS    ADJUST
```

Note

Alternatively, the VTR Maintenance mode can be started as follows instead of steps 6 and 7.

6. Select S00. CONTENTS and press the rotary encoder.
   (The arrow mark (→) appears next to the submenu.)
7. Rotate the rotary encoder to move the arrow mark (→) to 09. VTR MAINTE and press the rotary encoder.

11-2-3. How to Exit VTR Maintenance Mode

Set the MENU ON/OFF switch on the inside panel to the OFF position. (Closing the lid turns off the MENU ON/OFF switch automatically.)

11-2-4. Tips on Operations

- The function buttons for inserting a cassette tape, shooting, recording and playing back can be operated from the displays on which the black square box (■) appears at the top right. Note that operation may not work as expected when the function buttons are operated while CHECK/ADJUST is in progress. Note that the function buttons for inserting a cassette tape and other functions cannot be operated on the displays without the black square box (■) displayed at the top right.
- There is no specific order of operation in the respective menu items; each menu item can be operated independently. However, by performing all of the menu items in numerical order of menu number, the unit can be thoroughly checked and adjusted by the built-in CHECK/ADJUST functions.
- Be sure to use the specified alignment tape and/or working tape in the CHECK/ADJUST items that require a cassette tape to be used.

11-3. Contents of Menus

11-3-1. Servo System Self-Diagnosis Mode (C0 : SERVO CHECK)

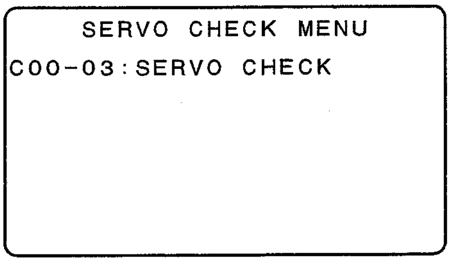
This mode self-diagnoses the servo system automatically or manually.

Note

To self-diagnose the servo system manually, the outside panel needs to be removed.

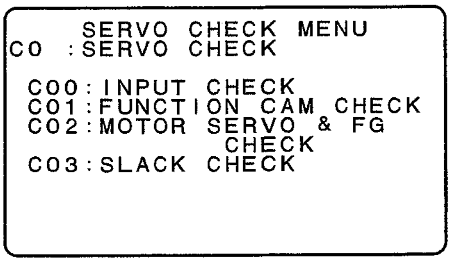
Operation procedure

1. Let the display show the top menu of VTR MAINTE menu. (Refer to Section 11-2-2.)
2. Press the rotary encoder. (If a cassette tape is inserted, it is ejected automatically.)
3. Select C0 : SERVO CHECK and press the rotary encoder. The message "C00-03 : SERVO CHECK" appears.



```
    SERVO CHECK MENU
C00-03:SERVO CHECK
```

4. Press the rotary encoder. The SERVO CHECK MENU display appears.

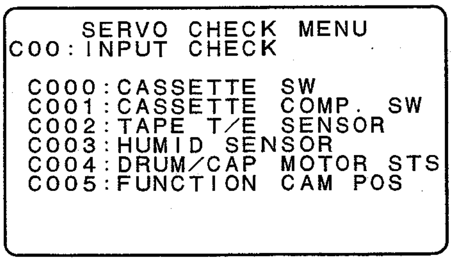


```
    SERVO CHECK MENU
C0  :SERVO CHECK

 C00:INPUT CHECK
 C01:FUNCTION CAM CHECK
 C02:MOTOR SERVO & FG
            CHECK
 C03:SLACK CHECK
```

C00 : INPUT CHECK

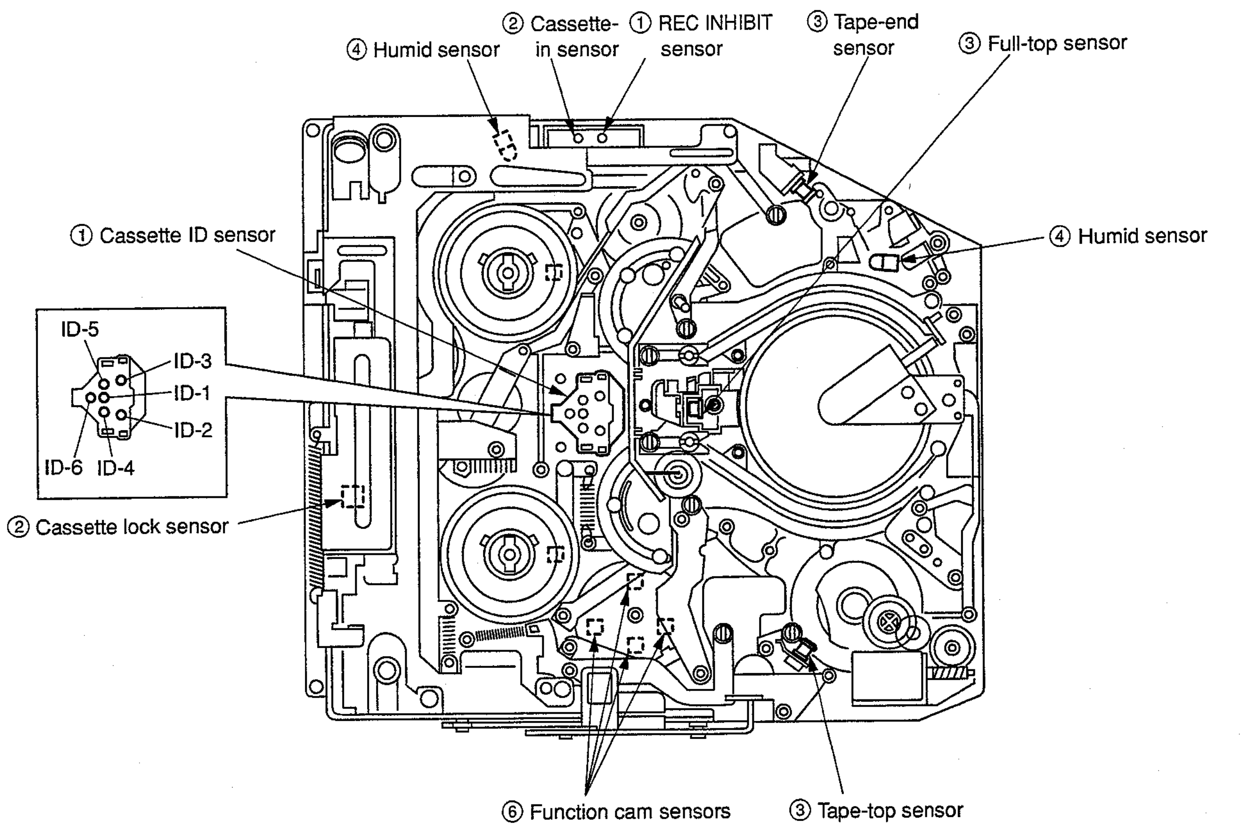
Checks the sensor operations automatically or manually.

1. From the SERVO CHECK MENU display, select "C00 : INPUT CHECK" and press the rotary encoder.
2. Select the desired item to be checked and press the rotary encoder.
3. The selected item is checked.
4. Press the ESCAPE switch to return to the INPUT CHECK display.



```
    SERVO CHECK MENU
C00:INPUT CHECK

 C000:CASSETTE SW
 C001:CASSETTE COMP. SW
 C002:TAPE T/E SENSOR
 C003:HUMID SENSOR
 C004:DRUM/CAP MOTOR STS
 C005:FUNCTION CAM POS
```

Sensor locations

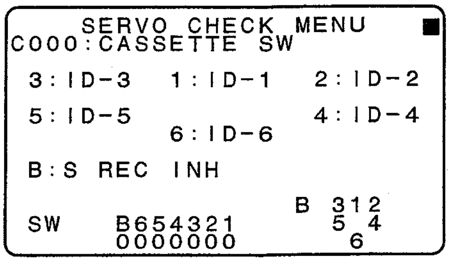

② Cassette-in sensor
① REC INHIBIT sensor
③ Tape-end sensor
④ Humid sensor
③ Full-top sensor
① Cassette ID sensor
④ Humid sensor
ID-5
ID-3
ID-1
ID-2
ID-6
ID-4
② Cassette lock sensor
⑥ Function cam sensors
③ Tape-top sensor

Note

The numbers that are put to the sensors in the illustration correspond to the menu item numbers of the INPUT CHECK in Section 11.

① C000 : CASSETTE SW

Checks the functions of the cassette ID sensor and the REC INHIBIT sensor.



```
        SERVO  CHECK  MENU          ■
C000:CASSETTE  SW
 3:ID-3     1:ID-1      2:ID-2
 5:ID-5                 4:ID-4
            6:ID-6
 B:S  REC  INH
                        B  312
 SW     B654321            5 4
        0000000             6
```

1. Select "C000 : CASSETTE SW" and press the rotary encoder.
2. Press the cassette ID sensor and the REC INHIBIT sensor with a fingertip. Alternatively, insert a cassette tape so that the above sensors are pressed down.
3. Check that the bit corresponding to the pressed sensor changes to "1" on the display. (The bit corresponding to the un-pressed sensor remains "0".)
   When a cassette tape BCT-32MX (or 64MX) is inserted and if it is not set to REC INHIBIT, the bit numbers 1, 2, 3, 6 and B change to "1".
   (For details of the respective sensors, refer to Section 1-1-3, "Sensor Layout Diagram and Function Description".)

   Notes

   If the bit that corresponds to the pressed sensor does not change to "1", or does not return to "0" when released, check the following.

   For the cassette ID sensor
   - The corresponding cassette ID sensor (Refer to the table below.)
   - Signal path between the MDC-13A board and the SS-92 board

   For the REC INHIBIT sensor
   - REC INHIBIT sensor (Refer to the table below.)
   - Signal path between the SE-613 board and the MDC-13A board
   - Signal path between the MDC-13A board and the SS-92 board

Sensor correspondence table

Cassette ID sensor

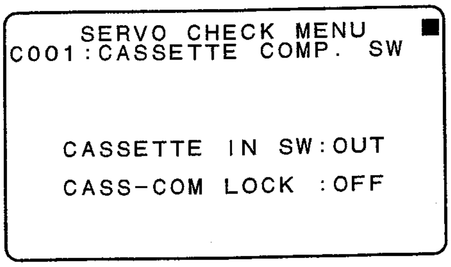
ID	ID-1	ID-2	ID-3	ID-4	ID-5	ID-6
Ref./ MDC-13A board	S308	S304	S305	S303	S301	S302

REC INHIBIT sensor

ID	B
Ref./ SE-613 board	S1

② C001 : CASSETTE COMP. SW

Checks functions of the sensors used in the cassette compartment block.



```
     SERVO CHECK MENU    ■
C001:CASSETTE COMP. SW


   CASSETTE IN SW:OUT
   CASS-COM LOCK  :OFF
```

1. Select "C001 : CASSETTE COMP. SW" and press the rotary encoder.
2. Check to see that the sensor of the cassette compartment changes its status on the monitor from "OFF" → "DET" → "OFF" when the cassette lid is opened, and a cassette tape is inserted gently and then the cassette is pushed in until the clicking sound is heard.
3. Check that the cassette-in sensor changes its status on the monitor from "OUT" to "IN".
4. Check that the status returns from "IN" to "OUT" when the EJECT button is pressed. (The status of the cassette-lock sensor on the monitor changes from "OFF" → "DET" → "OFF" either when the cassette lid is closed and when the EJECT button is pressed.)

   Notes

   If status of the cassette-in sensor does not change its status to "IN" or does not return to "OUT", or if status of the cassette-lock sensor does not change to "IN" or does not return to "OFF", check the followings.

   For the cassette-in sensor
   - Cassette-in sensor (S2/SE-613 board)
   - Signal path between the SE-613 board and the MDC-13A board
   - Signal path between the MDC-13A board and the SS-92 board

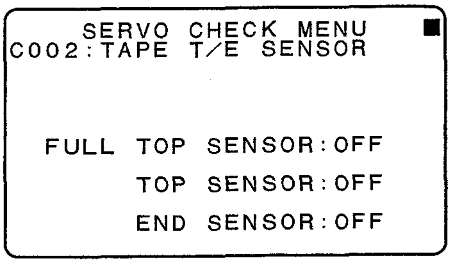
   For the cassette-lock sensor
   - Cassette-lock sensor (PH307/ MDC-13A board)
   - Cassette lock detector circuit (Q307 and others/MDC-13A board and IC1 and others/SS-92 board)
   - Signal path between the MDC-13A board and the SS-92 board

Note

Function of the cassette-in sensor can be checked by pressing the cassette-in sensor with finger. However, if it is pressed by finger, the unit judges that a cassette tape is inserted and SLACK-342 occurs.

③ C002 : TAPE T/E SENSOR

Checks functions of the tape-top sensor, tape-end sensor and full-top sensor.



```
     SERVO CHECK MENU     ■
C002:TAPE T/E SENSOR


  FULL TOP SENSOR:OFF
       TOP SENSOR:OFF
       END SENSOR:OFF
```

1. Select “C002 : TAPE T/E SENSOR” and press the rotary encoder.
2. Bring a piece of metal (such as screwdriver tip) closer to the full-top sensor. Check that status of the full-top sensor on the monitor changes from “OFF” to “DET”. Check also that status returns from “DET” to “OFF” when a piece of metal is removed from the sensor.
3. Insert a cassette tape and rewind it to the tape top. Check to see that status of the top-sensor changes to “DET” at the tape top and then returns to “OFF”.
   At the same time, the tape is advanced in fast-forward (or play). Check to see that status of the end-sensor change to “DET” at the tape end and then returns to “OFF”.

   Notes

   If “DET” is not displayed at the specified position or status does not return to “OFF”, check the followings.
   - Tape position detector circuit (IC304 and others/MDC-13A board and IC1 and others/SS-92 board)
   - Signal path between the respective sensors and the MDC-13A board (CN508, CN509, CN512)
   - Signal path between the MDC-13A board and the SS-92 board

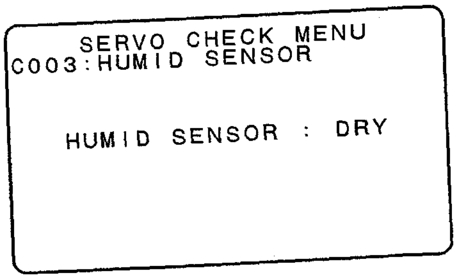
Notes

This unit monitors the following sensors.

• When a cassette tape is running in the FWD direction :	Tape-end sensor
• When a cassette tape is running in the REW direction :	Tape-top sensor
• When a cassette tape is not inserted :	Full-top sensor

④ C003 : HUMID SENSOR

Checks operation of the humid sensor.



```
   SERVO CHECK MENU
C003:HUMID SENSOR

   HUMID SENSOR : DRY
```

1. Select “C003 : HUMID SENSOR” and press the rotary encoder.
2. Touch the humid sensor (2 locations) with a cotton swab moistened with water.
3. Check to see that “DRY” changes to “WET” when the humid sensor is moistened.

   Note

   “WET” appears even only one of the two sensors is moistened and detects humidity. Therefore, check the two sensors respectively.

4. Check that the monitor display changes to “DRY” when the humid sensor is dried as it is wiped with a dry cotton swab or as the water content is evaporated by blowing air with a blower.

   Notes

   If the monitor display does not change from “DRY” to “WET” when the humid sensor is moistened or if the monitor display does not return from “WET” to “DRY” when the humid sensor is dried, check the followings.

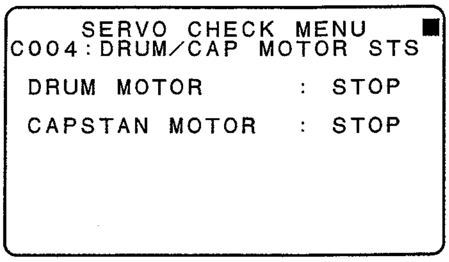
   - Humid sensor
   - Humid detector circuit (IC303 and others/MDC-13A board, IC1 and others/SS-92 board)
   - Signal path between the respective sensors and the MDC-13A board (CN510, CN511)
   - Signal path between the MDC-13A board and the SS-92 board

   Note

   The TALLY lamp keeps turning on for about 60 seconds after the display returned from “WET” to “DRY” and the HUMID display keeps appearing on the display window.
   (For the details of the warning system, refer to Section “6-3 Operation Warnings” of Operation Manual.)

⑤ C004 : DRUM/CAP MOTOR STS

Indicates the operating status of drum motor and capstan motor.



```
    SERVO CHECK MENU  ■
C004:DRUM/CAP MOTOR STS
 DRUM MOTOR       : STOP
 CAPSTAN MOTOR    : STOP
```

Note

In order to let the capstan motor enter the "LOCK" state, a cassette tape on which the CTL signal is already recorded, must be played back.

Playback an appropriate cassette tape on which the CTL signal is already recorded, or playback the alignment MR2-1P (Part No. 8-960-077-61) or MR5-1/1P (Part No. 8-960-077-01 : MR5-1, 8-960-077-51 : MR5-1P.)

1. Select "C004 : DRUM/CAP MOTOR STS" and press the rotary encoder.
2. The operating status of drum motor and capstan motor are displayed on display.
   <Status of each motor>
   When stopped : STOP
   When rotating (non-locked) : ROTATE
   When rotating (locked) : LOCK

   Notes

   If a motor does not rotate, or if the monitor display does not change even if the motor is rotating, check the followings.

   - Drum motor and the motor driver circuit (IC1 and others/MDR-14 board)
   - Drum FG/PG detector circuit (IC4 and others/MDR-14 board, IC1 and others/SS-92 board)
   - Reference signal (DVP_REF_FRM/CF) (DVP-20 board)
   - Capstan motor and the motor driver circuit (IC102 and others/MDC-13A board)
   - Capstan FG detector circuit (IC201 and others/MDC-13A board, IC1 and others/SS-92 board)
   - Signal path between and the MDR-14 board and the MDC-13A board
   - Signal path between the MDC-13A board and the SS-92 board

⑥ C005 : FUNCTION CAM POS

Indicates the detecting position of the function gear.

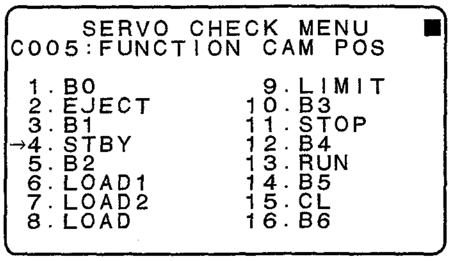
1. Select "C005: FUNCTION CAM POS" and press the rotary encoder.
2. Insert a working tape (blank tape: BCT-60MX that is commercially available) and check to see that the arrow mark (→) moves.
3. Check to see that the arrow mark (→) moves when the PLAY button is pressed.
4. Check to see that the arrow mark (→) moves when the STOP button is ipressed.
5 Check to see that the arrow mark (→) moves when the tape EJECT button is pressed.

Notes

If the arrow mark (→) does not move even when the tape is inserted or ejected, check the followings.

- Function cam sensor (PH301 to PH304/MDC-13A board)
- Cam position detector circuit (Q301 and others/MDC-13A board, IC1 and others/SS-92 board)
- Signal path between the MDC-13A board and the SS-92 board

If the function cam does not operate correctly, the SLACK error occurs. Take an appropriate measure in accordance with the corresponding error code referring to Section "3. Error Diagnostics".



```
      SERVO CHECK MENU       ■
C005:FUNCTION CAM POS

  1.B0              9.LIMIT
  2.EJECT          10.B3
  3.B1             11.STOP
→4.STBY            12.B4
  5.B2             13.RUN
  6.LOAD1          14.B5
  7.LOAD2          15.CL
  8.LOAD           16.B6
```

Note

The display on monitor changes in accordance with the status of the function cam sensor as shown in the Function Cam Code Transition Table.

The status of each sensor can be checked by either one of the following two methods.

1. Observe the check-land (CL301 to CL304/MDC-13A board) with an oscilloscope. The SS-92 board must have been removed earlier to connect an oscilloscope to the check-land. As the function cam can be moved of its position by hand, the sensor status also changes. Move the function cam by hand as follows and check that the sensor status changes accordingly as shown in the table.
   - While pushing the manual eject gear with a flat-head screwdriver tip, rotate the manual eject gear in the clockwise direction (unloading direction) or counterclockwise direction (loading direction). (Refer to Section 1-11.)

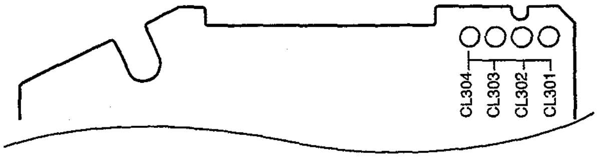
   Note

   If the front lid has been opened, never rotate the gear in the clockwise direction.

2. Connect the SS-92 board connector (CN201) and the MDC-13A board connector (CN201) with the use of the EX-764 board and the two flexible card wires (45 pins). Check the function cam sensor status with an oscilloscope referring to the function cam code transition table.
   In this case, the function cam is controlled of its position automatically by the SS-92 board. Therefore, check that the function cam sensor status matches with the monitor display as shown in the Function Cam Code Transition table.

Function Cam Code Transition Table

Detecting position	**Sensor status (MDC-13A board)**			
Monitor display	CL304 (CN201-39)	CL303 (CN201-40)	CL302 (CN201-41)	CL301 (CN201-42)
B0	H	L	L	L
EJECT	H	L	L	H
B1	H	L	H	H
STBY	H	L	H	L
B2	H	H	H	L
LOAD1	H	H	H	H
LOAD2	H	H	L	H
LOAD	H	H	L	L
LIMIT	L	H	L	L
B3	L	H	L	H
STOP	L	H	H	H
B4	L	H	H	L
RUN	L	L	H	L
B5	L	L	H	H
CL	L	L	L	H
B6	L	L	L	L

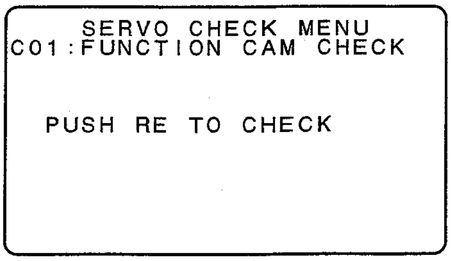


MDC-13A board (A side)

C01 : FUNCTION CAM CHECK

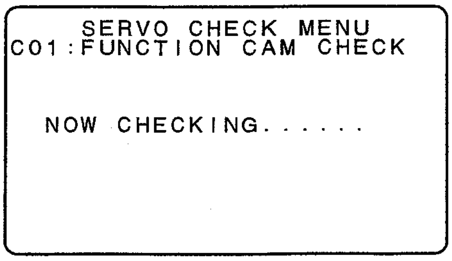
Checks operation of the function cam automatically.

1. Select "C01: FUNCTION CAM CHECK" on the SERVO CHECK MENU display and press the rotary encoder.



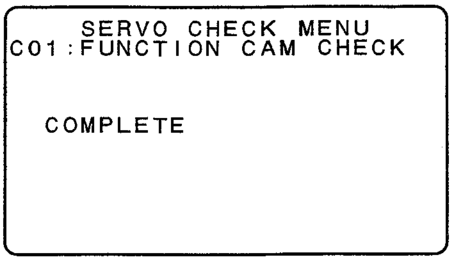
```
    SERVO CHECK MENU
C01:FUNCTION CAM CHECK

 PUSH RE TO CHECK
```

2. Press the rotary encoder again, then the self-diagnosis starts.



```
    SERVO CHECK MENU
C01:FUNCTION CAM CHECK

 NOW CHECKING......
```

3. The self-diagnosis ends and the result of the self-diagnosis is display.
   When the self-diagnosis ends successfully :
   The message "COMPLETE" appears.
   When the self-diagnosis fails :
   The message "INCOMPLETE" appears.



```
    SERVO CHECK MENU
C01:FUNCTION CAM CHECK

 COMPLETE
```

4. Press the ESCAPE switch to return to the SERVO CHECK MENU display.

   Notes

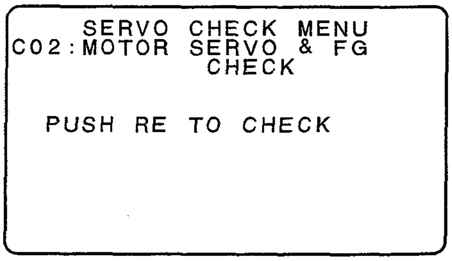
   If the message "INCOMPLETE" appears (the SLACK indication does not appear), perform the following.

   1) Press the ESCAPE switch to return to the SERVO CHECK MENU display.
   2) Let the display show C00: INPUT CHECK → C005 : FUNCTION CAM POS and check the faulty positions. (The arrow mark (→) stops at the position where error occurs.)
   3) Investigate the cause of the trouble by following SLACK-61 and SLACK-62 referring to Section "3. Error Diagnostics".

C02 : MOTOR SERVO & FG CHECK

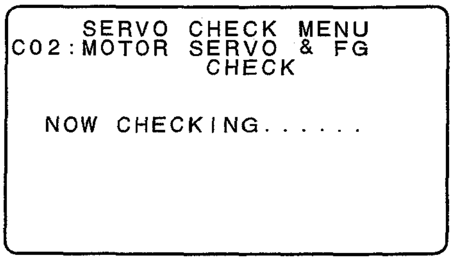
Checks operation of the servo system motor automatically.

1. Select “C02 : MOTOR SERVO & FG CHECK” on the SERVO CHECK MENU display and press the rotary encoder.



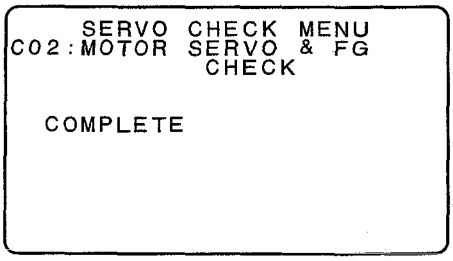
```
    SERVO CHECK MENU
C02:MOTOR SERVO & FG
          CHECK

  PUSH RE TO CHECK
```

2. Check that a cassette tape is not inserted, and press the rotary encoder. The self-diagnosis starts.



```
    SERVO CHECK MENU
C02:MOTOR SERVO & FG
          CHECK

  NOW CHECKING......
```

3. The self-diagnosis ends and the result of the self-diagnosis is display.
   When the self-diagnosis ends successfully :
   The message “COMPLETE” appears.
   When the self-diagnosis fails :
   The message “INCOMPLETE” appears.



```
    SERVO CHECK MENU
C02:MOTOR SERVO & FG
          CHECK

  COMPLETE
```

4. Press the ESCAPE switch to return to the SERVO CHECK MENU display.

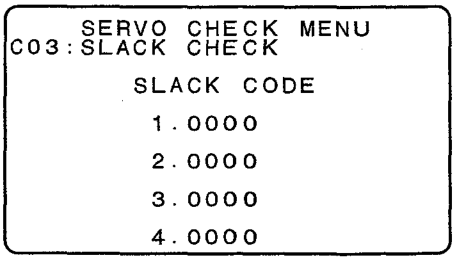
Note

When the message “INCOMPLETE” appears, perform the following.
The TALLY lamp flashes and an error code appears in the timecode position on the display window.
(For the details of the warning system, refer to “3-1-2. Details of Error Codes.)

C03 : SLACK CHECK

Displays the history of the 4 slack detections that have occurred in the past.

1. Select “C03 : SLACK CHECK” on the SERVO CHECK MENU display and press the rotary encoder.
2. The SLACK information in the past is displayed as follows.
   1 : Newest information
   4 : Oldest information
   For details of the SLACK information, refer to “3. Error Diagnostics”.



```
    SERVO CHECK MENU
C03:SLACK CHECK
       SLACK CODE
         1.0000
         2.0000
         3.0000
         4.0000
```

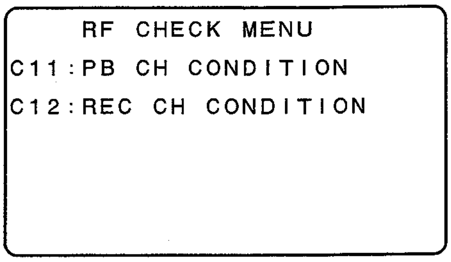
3. Press the ESCAPE switch to return to the SERVO CHECK MENU display.

11-3-2. RF System Self-Diagnosis Mode (C1 : RF CHECK)

Checks the error conditions of the RF system during recording and playback. Result of the self-diagnosis is displayed in 3 steps (GRN, YEL and RED).

Operating procedure

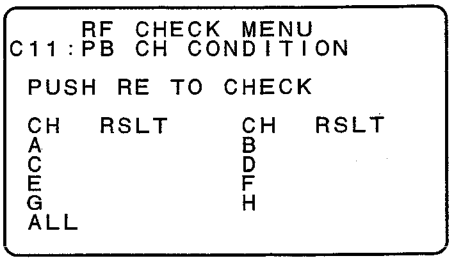
1. Let the display show the top menu of VTR MAINTE menu. (Refer to Section 11-2-2.)
2. Press the rotary encoder. (If a cassette tape is inserted, it is ejected automatically.)
3. Select "C1 : RF CHECK" and press the rotary encoder. The RF CHECK MENU display appears.



```
    RF CHECK MENU
C11:PB CH CONDITION
C12:REC CH CONDITION
```

C11 : PB CH CONDITION

1. Select "C11: PB CH CONDITION" on the RF CHECK MENU display and press the rotary encoder.



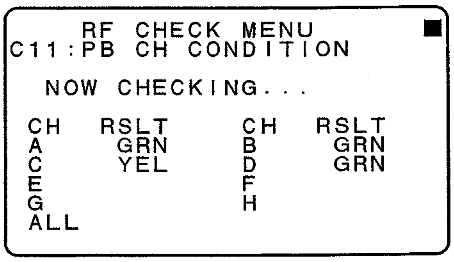
```
    RF CHECK MENU
C11:PB CH CONDITION
 PUSH RE TO CHECK
 CH  RSLT     CH  RSLT
 A            B
 C            D
 E            F
 G            H
 ALL
```

① To diagnose all channels

1. Insert the alignment tape (MR5-1 : Part No. 8-960-077-01, MR5-1P : Part No. 8-960-077-51).

   Note

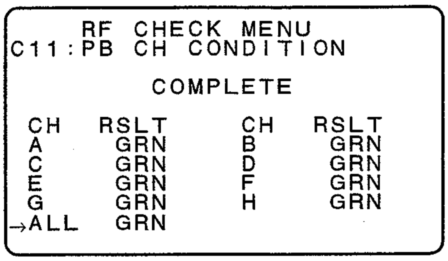
   Select the portion of the alignment tape that has 2 minutes of continuous recording.



```
    RF CHECK MENU        ■
C11:PB CH CONDITION
  NOW CHECKING...
 CH  RSLT     CH  RSLT
 A    GRN     B    GRN
 C    YEL     D    GRN
 E            F
 G            H
 ALL
```

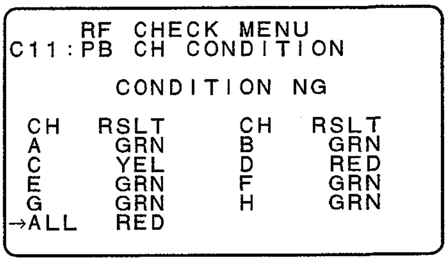
2. Select ALL and press the rotary encoder.
3. The self-diagnosis starts from channel A. If the alignment tape is not inserted, the message "INSERT MR5-1" (for NTSC, "INSERT MR5-1P" for PAL) appears and the cassette lid opens. When the alignment tape is inserted, "WAITING ..." appears and then the self-diagnosis starts.

4. The adjustment results of all channels are displayed.
   When the adjustment ends normally :
   "GRN" is displayed in the ALL column.



```
     RF  CHECK  MENU
C11:PB  CH  CONDITION

          COMPLETE

  CH    RSLT       CH    RSLT
  A      GRN       B      GRN
  C      GRN       D      GRN
  E      GRN       F      GRN
  G      GRN       H      GRN
→ALL    GRN
```

When the adjustment fails :
"CONDITION NG" is displayed. The worst result is displayed in the ALL column.



```
     RF  CHECK  MENU
C11:PB  CH  CONDITION

        CONDITION  NG

  CH    RSLT       CH    RSLT
  A      GRN       B      GRN
  C      YEL       D      RED
  E      GRN       F      GRN
  G      GRN       H      GRN
→ALL    RED
```

Note

When the adjustment fails: "CONDITION NG" is displayed, check the followings in the order as shown below again.

1. Change the playback position of the alignment and perform the check again.
   → When no abnormality is found, this is the end of the check.
2. Perform cleaning with the use of a cleaning tape and repeat the above check.
   → When no abnormality is found, this is the end of the check.
3. Perform cleaning with the use of a cleaning tape again and repeat the above check.
   → When no abnormality is found, this is the end of the check.
4. Perform cleaning with the use of a cleaning cloth (referring to Section 2-1) and repeat the above adjustment again.
   → When no abnormality is found, this is the end of the check.
   If the check fails still, check the following possible causes.
   - Defective adjustment of the servo system, or servo circuit is defective.
   - Defective adjustment of the RF playback system.
   - The playback heads inside the drum assembly were worn out.
   - Defective adjustment of tape run system, or part mounting is defective.
   - EQ-88 board is defective.
   - Drum assembly is defective

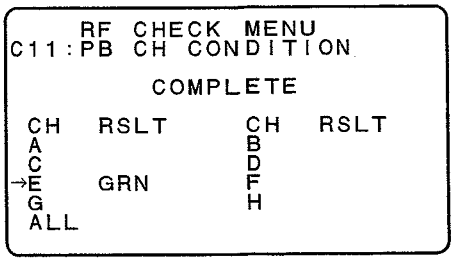
② To check the desired channel only

1. Insert the alignment tape (MR5-1 : Part No. 8-960-077-01, MR5-1P : Part No. 8-960-077-51).

   Note

   Select the portion of the alignment tape that has 30 seconds of continuous recording.

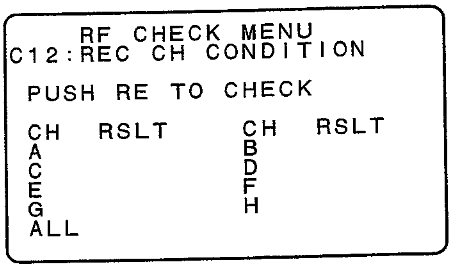
2. Select the desired channel to check and press the rotary encoder.
3. The check result appears in the selected channel only. (It is not displayed in the ALL column.)



```
     RF  CHECK  MENU
C11:PB  CH  CONDITION

          COMPLETE

  CH    RSLT       CH    RSLT
  A                B
  C                D
→E      GRN        F
  G                H
  ALL
```

C12 : REC CH CONDITION

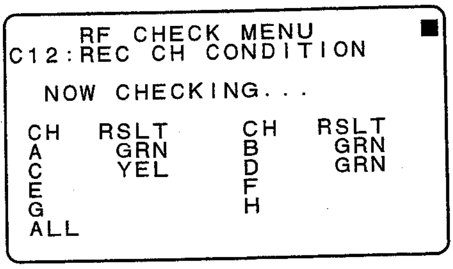
1. Select “C12 : REC CH CONDITION” on the RF CHECK MENU display and press the rotary encoder.



```
     RF CHECK MENU
C12:REC CH CONDITION
 PUSH RE TO CHECK
 CH   RSLT      CH   RSLT
 A              B
 C              D
 E              F
 G              H
 ALL
```

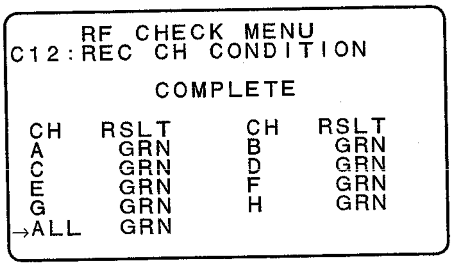
① To diagnose all channels

1. Insert a working tape (blank tape: BCT-60MX that is commercially available).
2. Select ALL and press the rotary encoder.
3. The self-diagnosis starts from channel A.
   If a working tape is not inserted, the message “INSERT WORK TAPE” appears and the cassette lid opens. When a working tape is inserted, the self-diagnosis starts.



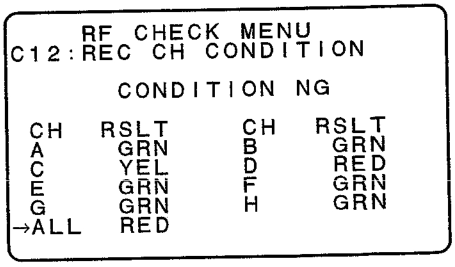
```
     RF CHECK MENU        ■
C12:REC CH CONDITION
  NOW CHECKING...
 CH   RSLT      CH   RSLT
 A     GRN      B     GRN
 C     YEL      D     GRN
 E              F
 G              H
 ALL
```

4. The self-diagnosis results of all channels are displayed.
   When the self-diagnosis ends normally :
   “GRN” is displayed in the ALL column.



```
     RF CHECK MENU
C12:REC CH CONDITION
      COMPLETE
 CH   RSLT      CH   RSLT
 A     GRN      B     GRN
 C     GRN      D     GRN
 E     GRN      F     GRN
 G     GRN      H     GRN
→ALL   GRN
```

When the self-diagnosis fails :
“CONDITION NG” is displayed. The worst result is displayed in the ALL column.



```
     RF CHECK MENU
C12:REC CH CONDITION
    CONDITION NG
 CH   RSLT      CH   RSLT
 A     GRN      B     GRN
 C     YEL      D     RED
 E     GRN      F     GRN
 G     GRN      H     GRN
→ALL   RED
```

Note

When the adjustment fails and “CONDITION NG” is displayed, check the followings in the order as shown below.

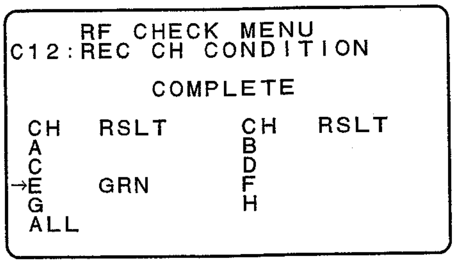
1. Perform C11 : PB CH CONDITION check again using the alignment tape (MR5-1/1P).
2. If any abnormality is found, check the possible causes referring to **Note** of C11 : PB CH CONDITION.

If abnormality cannot be found in the above check, perform the check again in the following order shown below.

1. Perform cleaning with the use of a cleaning tape and check the “REC Channel Condition Check” using a working tape.
   → When no abnormality is found, this is the end of the check.
2. Perform cleaning with the use of a cleaning tape again and repeat the above check.
   → When no abnormality is found, this is the end of the check.
3. Perform cleaning with the use of a cleaning cloth (referring to Section 2-1) and repeat the above adjustment again.
   → When no abnormality is found, this is the end of the check.
   If the check fails still, check the following possible causes.
   - Defective adjustment of the servo system, or servo circuit is defective.
   - The playback heads inside the drum assembly were worn out.
   - Defective adjustment of tape run system, or part mounting is defective.
   - EQ-88 board is defective.
   - Drum assembly is defective.

② To check the desired channel only

1. Insert a working tape (blank tape: BCT-60MX that is commercially available).
2. Select the desired channel to check and press the rotary encoder.
3. The check result appears in the selected channel only. (It is not displayed in the ALL column.)



```
      RF  CHECK  MENU
C12:REC  CH  CONDITION

           COMPLETE

 CH   RSLT        CH   RSLT
 A                B
 C                D
→E    GRN         F
 G                H
 ALL
```

11-3-3. SERVO System Adjustment Mode (A0 : SERVO ADJUST)

This mode adjusts the servo system automatically.
The adjustment data obtained by this adjustment is automatically saved in the servo system EEPROM (IC403/MDC-13A board) upon completion of this adjustment.

Notes

- Before starting the servo system adjustment, be sure to set the VTR SAVE/STBY switch on the inside panel to the STBY position.
- When an adjustment fails, the message "INCOMPLETE" appears on the menu display. The following two causes are possible.
  1. The adjustment itself has not completed to its end.
  2. The adjustment ended successfully but the data failed to be saved in the servo system EEPROM.

  To determine which of the above two causes applies, execute "A000 : NV-RAM INITIALIZE" to check if communication with the servo system EEPROM is faulty or not. If "A000 : NV-RAM INITIALIZE" ends with the message "INCOMPLETE", communication with the servo system EEPROM may have an error and the data saving operation has ended with fail.

The SERVO system adjustment is required when the following boards and the parts are replaced.
When the following boards or parts are replaced, execute the corresponding adjustment item as shown below.

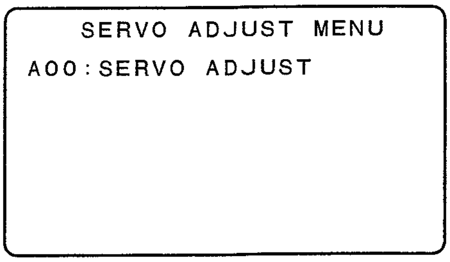
Note

When both A001 : CAPSTAN FG DUTY and A002 : CAPSTAN DELAY must be executed, execute them in the order of A001 → A002.

Replaced board/part	Adjustment item to be executed
MDR-14 board	A003 : DRUM PHASE
Upper drum assembly	A003 : DRUM PHASE
Drum assembly	A003 : DRUM PHASE
S-Tension regulator band assembly	A002 : CAPSTAN DELAY
T-tension regulator band assembly	A002 : CAPSTAN DELAY
Timing belt	A002 : CAPSTAN DELAY
S/T idler assembly	A002 : CAPSTAN DELAY
S-soft-brake assembly	A002 : CAPSTAN DELAY
T-soft brake arm	A002 : CAPSTAN DELAY
S-tension regulator assembly	A002 : CAPSTAN DELAY
T-tension regulator assembly	A002 : CAPSTAN DELAY
Reel table	A002 : CAPSTAN DELAY
Reel drive gear assembly	A002 : CAPSTAN DELAY
Pinch arm assembly	A002 : CAPSTAN DELAY
MDC-13A board	A001 : CAPSTAN FG DUTY
	A002 : CAPSTAN DELAY
	A003 : DRUM PHASE
Capstan motor	A001 : CAPSTAN FG DUTY
	A002 : CAPSTAN DELAY

Operating procedure

1. Let the display show the top menu of VTR MAINTE menu. (Refer to Section 11-2-2.)
2. Press the rotary encoder. (If a cassette tape is inserted, it is ejected automatically.)
3. Select “A0 : SERVO ADJUST” and press the rotary encoder. The A00 : SERVO ADJUST MENU display appears.



```
      SERVO  ADJUST  MENU
A00:SERVO  ADJUST
```

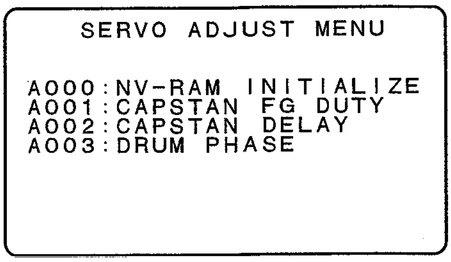
A000 : NV-RAM INITIALIZE

When the servo system EEPROM (IC403/MDC-13A board) is replaced, the servo system adjustment data is initialized.

Notes

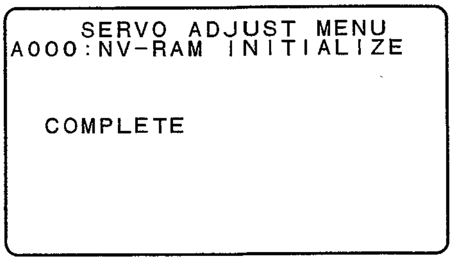
- Turn off the main power of this unit when adjustment is completed.
- Turn on the main power again, then be sure to implement the following servo adjustments.
  A001 : CAPSTAN FG DUTY
  A002 : CAPSTAN DELAY
  A003 : DRUM PHASE

1. Select “A000 : NV-RAM INITIALIZE” on the SERVO ADJUST MENU display and press the rotary encoder.
2. Press the rotary encoder again, then the initialization starts.



```
      SERVO  ADJUST  MENU

A000:NV-RAM  INITIALIZE
A001:CAPSTAN  FG  DUTY
A002:CAPSTAN  DELAY
A003:DRUM  PHASE
```

3. Initialization ends.
   When the initialization ends successfully :
   The message “COMPLETE” appears.
   When the initialization fails :
   The message “INCOMPLETE” appears.
   Notes
   When the initialization fails and the message “INCOMPLETE” appears, check the following possible causes.
   - IC403/MDC-13A board is defective.
   - Communication between the MDC-13A board and the SS-92 board is defective.

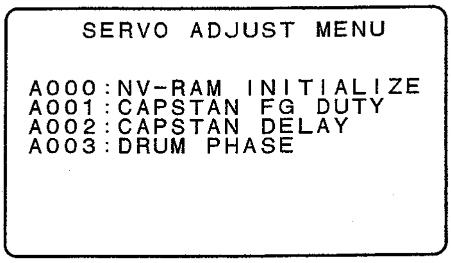


```
      SERVO  ADJUST  MENU
A000:NV-RAM  INITIALIZE

  COMPLETE
```

A001 : CAPSTAN FG DUTY

Adjusts the duty ratio of the capstan FG signal.

1. Select "A001 : CAPSTAN FG DUTY" on the SERVO ADJUST MENU display and press the rotary encoder.
2. Press the rotary encoder again to start adjustment.

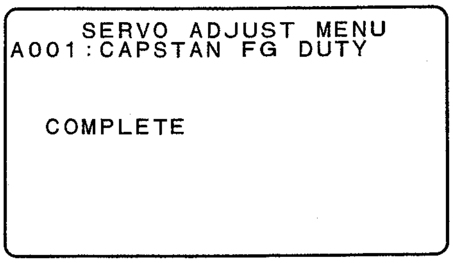


```
      SERVO  ADJUST  MENU

A000:NV-RAM  INITIALIZE
A001:CAPSTAN  FG  DUTY
A002:CAPSTAN  DELAY
A003:DRUM  PHASE
```

3. The adjustment ends. (The adjustment data is automatically saved in the servo system EEPROM (IC403/MDC-13A board)).
   When adjustment ends successfully :
   The message "COMPLETE" appears.
   When the adjustment fails :
   The message "INCOMPLETE" appears.

   Notes

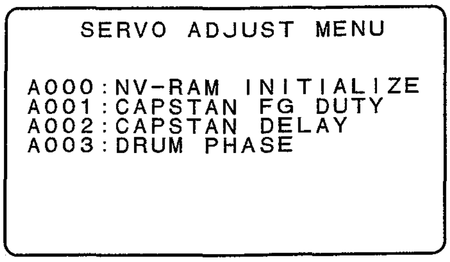
   When the adjustment fails, the message "INCOMPLETE" appears, check the following possible causes.
   - MDC-13A board capstan FG amplifier or capstan motor driver circuit is defective.
   - SS-92 board capstan drive output signal or duty ratio adjustment output signal is abnormal.
   - Capstan motor is defective.



```
      SERVO  ADJUST  MENU
A001:CAPSTAN  FG  DUTY


  COMPLETE
```

A002 : CAPSTAN DELAY

Adjusts the capstan add-on recording.
A working tape is required for this adjustment. Use the center position, which is at about 25 to 30 minute position of a BCT-60MX cassette tape.



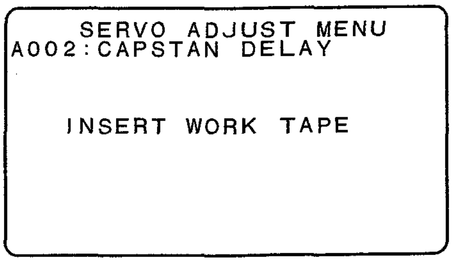
```
      SERVO  ADJUST  MENU

A000:NV-RAM  INITIALIZE
A001:CAPSTAN  FG  DUTY
A002:CAPSTAN  DELAY
A003:DRUM  PHASE
```

Note

You can check that a working tape is at about the 30-minute position as follows:

- The 6 black square indicators " ■ " turn on in the remaining tape indication area on the display window/inside panel.
- The message "30-25" appears in the remaining tape indication area on VF.

1. Select "A002 : CAPSTAN DELAY" on the SERVO ADJUST MENU display and press the rotary encoder.
2. Press the rotary encoder again. The cassette lid opens automatically.
3. When a working tape is inserted, the adjustment starts automatically.



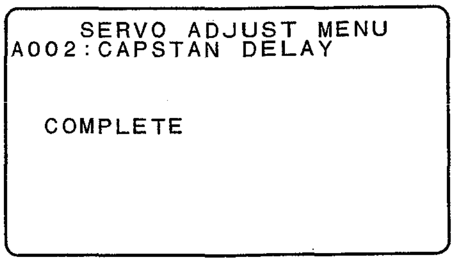
```
      SERVO  ADJUST  MENU
A002:CAPSTAN  DELAY


     INSERT  WORK  TAPE
```

4. The adjustment ends. (The adjustment data is automatically saved in the servo system EEPROM (IC403/MDC-13A board)). A working tape is ejected automatically.
   When adjustment ends successfully :
   The message "COMPLETE" appears.
   When the adjustment fails :
   The message "INCOMPLETE" appears.

   Notes

   When the adjustment fails, the message "INCOMPLETE" appears, check the following possible causes and then perform A002 : CAPSAN DELAY adjustment again.
   - Tape run is abnormal or the tape is damaged.
   - Tension of the timing belt needs adjustment.

   Refer to the following sections for adjusting the tension of the timing belt.
   8-1-3. FWD Holdback Tension Adjustment
   8-1-4. REV Holdback Tension Adjustment
   8-1-5. Timing Belt Tension Adjustment

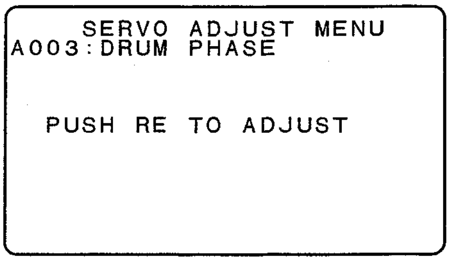


```
      SERVO  ADJUST  MENU
A002:CAPSTAN  DELAY


   COMPLETE
```

A003 : DRUM PHASE

Adjusts the drum phase.
The alignment tape (MR2-1P : Part No. 8-960-077-61) is required for this adjustment. The alignment tape (MR2-1P) is used at the position of 00 : 01 : 00 : 00 to 00 : 10 : 00 : 00.
Contents of this adjustment is same as that of "11-3-5. Mechanism Adjustment Mode (A4 : MECHANISM ADJUST), A41 : DRUM PHASE (Adjusts the drum phase)".

1. Select "A003: DRUM PHASE" on the SERVO ADJUST MENU display and press the rotary encoder.

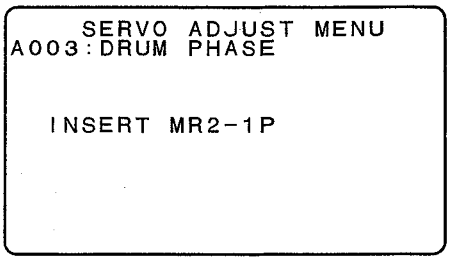


```
    SERVO  ADJUST  MENU
A003:DRUM  PHASE

  PUSH  RE  TO  ADJUST
```

2. Press the rotary encoder again. The cassette lid opens automatically.
3. When the alignment tape (MR2-1P : Part No. 8-960-077-61) is inserted, the adjustment starts automatically.

   Note

   Be sure to use the specified alignment tape. If any tape other than the specified alignment tape is used for this adjustment, the correct drum phase cannot be obtained even though "COMPLETE" appears upon completion of adjustment.

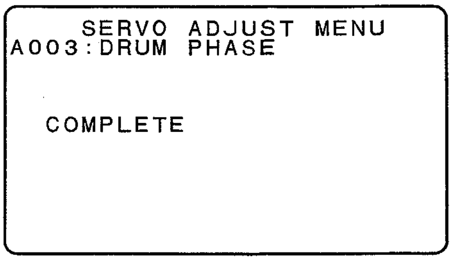


```
    SERVO  ADJUST  MENU
A003:DRUM  PHASE

  INSERT  MR2-1P
```

4. The adjustment ends. (The adjustment data is automatically saved in the servo system EEPROM (IC403/MDC-13A board)). The alignment tape is ejected automatically.
   When adjustment ends successfully :
   The message "COMPLETE" appears.
   When the adjustment fails :
   The message "INCOMPLETE" appears.

   Notes

   When the adjustment fails, the message "INCOMPLETE" appears, check the following possible causes and then perform A003 : DRUM PHASE adjustment again.
   - The alignment tape is not cued up to the correct position of 00 : 01 : 00 : 00.
   - Tape running is abnormal during playback mode.
   - IC303/MDC-13A board is defective.
   - Signal circuit between MDC-13A board and the SS-92 board is defective.
   - Signal circuit between EQ-88 board and the MDR-14 board is defective.
   - Signal circuit between MDC-13A board and the MDR-14 board is defective.
   - Drum motor unit is defective.



```
    SERVO  ADJUST  MENU
A003:DRUM  PHASE

  COMPLETE
```

11-3-4. RF System Adjustment Mode (A1 : RF ADJUST)

This item adjusts the RF system automatically.
The data display appears while the STOP button is being pressed. It is not displayed while the adjustment is in progress.

Operating procedure

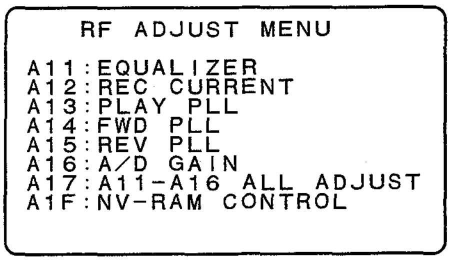
1. Let the display show the top menu of VTR MAINTE menu. (Refer to Section 11-2-2.)
2. Press the rotary encoder. (When a cassette tape is inserted, it is ejected automatically.)
3. Select "A1 : RF ADJUST" and press the rotary encoder. The RF ADJUST MENU display appears.

   Note

   In order to save the respective adjustment data, select A1F : NV-RAM CONTROL and execute "SAVE ALL ADJUSTMENT DATA".
   To return the adjustment data to the original data before starting adjustment, execute "RESTORE PREVIOUS DATA" on the A1F : NV-RAM CONTROL.

   Note

   If the message "INCOMPLETE" is displayed in the automatic adjustment, do not save the adjustment data in the NV-RAM (IC1104/EQ-88 board).

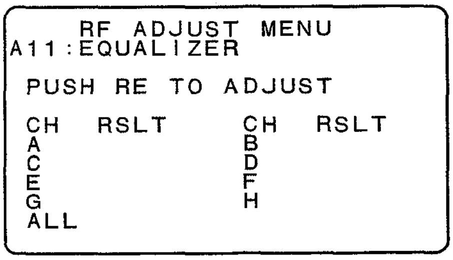


```
     RF ADJUST MENU
A11:EQUALIZER
A12:REC CURRENT
A13:PLAY PLL
A14:FWD PLL
A15:REV PLL
A16:A/D GAIN
A17:A11-A16 ALL ADJUST
A1F:NV-RAM CONTROL
```

A11 : EQUALIZER

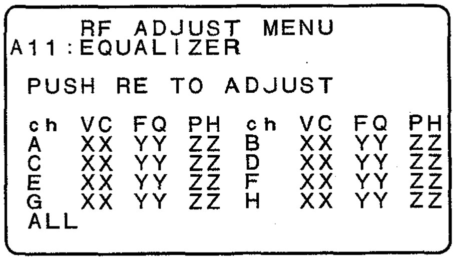
Adjusts the playback level (VC) of the PB heads, and the gain (FQ) and the phase (PH) of the playback equalizer circuit.

1. Select "A11: EQUALIZER" on the RF ADJUST MENU display and press the rotary encoder.



```
     RF ADJUST MENU
A11:EQUALIZER

 PUSH RE TO ADJUST

 CH  RSLT     CH  RSLT
 A            B
 C            D
 E            F
 G            H
 ALL
```

   When the STOP button is pressed at this timing, the adjustment data as of this timing is displayed.
   (XX, YY and ZZ are the 1-byte data.)



```
     RF ADJUST MENU
A11:EQUALIZER

 PUSH RE TO ADJUST

 ch VC FQ PH ch VC FQ PH
 A  XX YY ZZ B  XX YY ZZ
 C  XX YY ZZ D  XX YY ZZ
 E  XX YY ZZ F  XX YY ZZ
 G  XX YY ZZ H  XX YY ZZ
 ALL
```

① To adjust all channels

1. Insert the alignment tape (MR5-1 : Part No. 8-960-077-01, MR5-1P : Part No. 8-960-077-51).

   Note

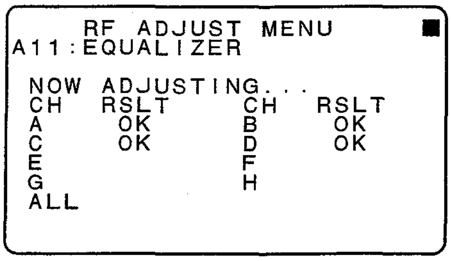
   Be sure to use the specified alignment tape. If any tape other than the specified alignment tape is used, the adjustment cannot be performed correctly.

2. Select ALL and press the rotary encoder.
3. The adjustment starts from channel A.

   If the alignment tape is not inserted, the message "INSERT MR5-1" (for NTSC, "INSERT MR5-1P" for PAL) appears and the cassette lid opens. When the alignment tape is inserted, "WAITING ..." appears and then the adjustment starts.

   Note

   If the message "WAITING ..." keeps appearing even though the automatic adjustment is started, the un-recorded segment might have been played back. In such a case, change the playback position of the alignment tape.



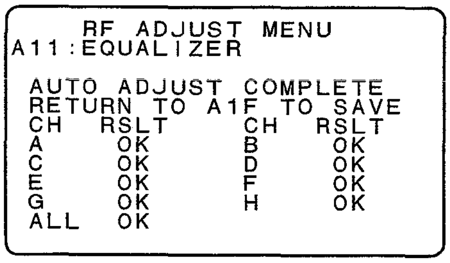
```
     RF ADJUST MENU           ■
A11:EQUALIZER

 NOW ADJUSTING...
 CH    RSLT      CH    RSLT
 A      OK       B      OK
 C      OK       D      OK
 E               F
 G               H
 ALL
```

4. The adjustment results of all channels are displayed.

   When STOP is pressed, data as of this timing is displayed.

   When the adjustment ends normally :

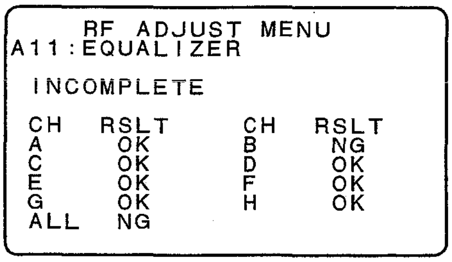
   OK is displayed in all channels and in the ALL column.



```
     RF ADJUST MENU
A11:EQUALIZER

 AUTO ADJUST COMPLETE
 RETURN TO A1F TO SAVE
 CH    RSLT      CH    RSLT
 A      OK       B      OK
 C      OK       D      OK
 E      OK       F      OK
 G      OK       H      OK
 ALL    OK
```

When the adjustment fails :

NG is displayed in the channel in which an error occurs and in the ALL ccolumn.



```
     RF ADJUST MENU
A11:EQUALIZER

 INCOMPLETE

 CH    RSLT      CH    RSLT
 A      OK       B      NG
 C      OK       D      OK
 E      OK       F      OK
 G      OK       H      OK
 ALL    NG
```

Note

When the message "INCOMPLETE" is displayed in both cases of ① and ②, refer to the item "If the message "INCOMPLETE" is displayed" in Section 11-3-4.

② To adjust the desired channel only

1. Insert the alignment tape (MR5-1/1P).
2. Select the channel to adjust and press the rotary encoder.
3. Result of adjustment appears for the selected channel only. (OK/NG is not displayed in the ALL column.)

   When STOP is pressed, data as of this timing is displayed.

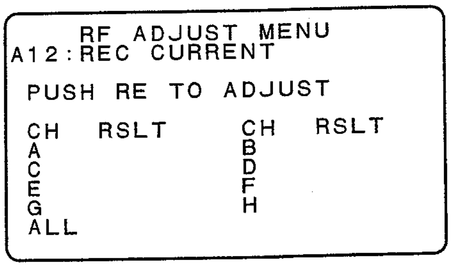
   When the adjustment ends normally : OK is displayed.

   When the adjustment fails : NG is displayed.

A12 : REC CURRENT

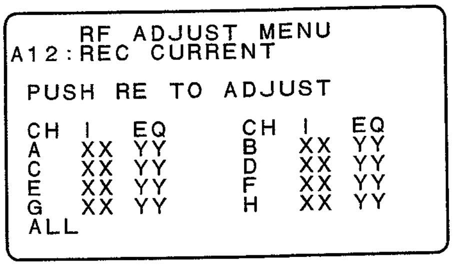
Adjusts the recording current and recording frequency response characteristics of the record heads automatically.

1. Select "A12 : REC CURRENT" on the RF ADJUST MENU display and press the rotary encoder.



```
      RF  ADJUST  MENU
A12:REC  CURRENT

 PUSH  RE  TO  ADJUST

 CH    RSLT        CH    RSLT
 A                 B
 C                 D
 E                 F
 G                 H
 ALL
```

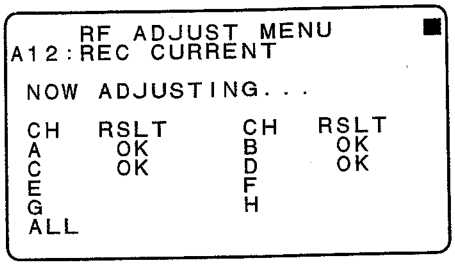
When the STOP button is pressed at this timing, the adjustment data as of this timing is displayed.
(XX and YY are the 1-byte data.)



```
      RF  ADJUST  MENU
A12:REC  CURRENT

 PUSH  RE  TO  ADJUST

 CH   I    EQ      CH   I    EQ
 A    XX   YY      B    XX   YY
 C    XX   YY      D    XX   YY
 E    XX   YY      F    XX   YY
 G    XX   YY      H    XX   YY
 ALL
```

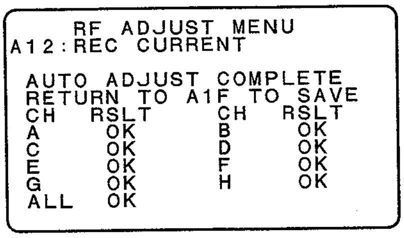
① To adjust all channels

1. Insert a working tape (blank tape: BCT-60MX that is commercially available).
2. Select ALL and press the rotary encoder.
3. The adjustment starts from channel A.
   If a working tape is not inserted, the message "INSERT WORK TAPE" appears and the cassette lid opens. When a working tape is inserted, and then the adjustment starts.



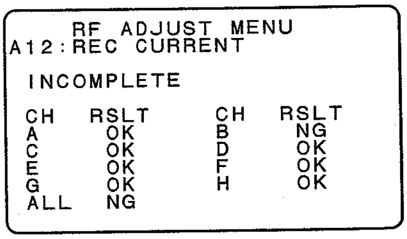
```
      RF  ADJUST  MENU
A12:REC  CURRENT

 NOW  ADJUSTING...

 CH    RSLT        CH    RSLT
 A      OK         B      OK
 C      OK         D      OK
 E                 F
 G                 H
 ALL
```

4. The adjustment results of all channels are displayed. When STOP is pressed, data as of this timing is displayed.
   When the adjustment ends normally :
   OK is displayed in all channels and in the ALL column.



```
      RF  ADJUST  MENU
A12:REC  CURRENT

 AUTO  ADJUST  COMPLETE
 RETURN  TO  A1F  TO  SAVE
 CH    RSLT      CH    RSLT
 A      OK       B      OK
 C      OK       D      OK
 E      OK       F      OK
 G      OK       H      OK
 ALL    OK
```

When the adjustment fails :
NG is displayed in the channel in which an error occurs and in the ALL ccolumn.



```
      RF  ADJUST  MENU
A12:REC  CURRENT

 INCOMPLETE

 CH    RSLT      CH    RSLT
 A      OK       B      NG
 C      OK       D      OK
 E      OK       F      OK
 G      OK       H      OK
 ALL    NG
```

Note

When the message "INCOMPLETE" is displayed in both cases of ① and ②, refer to the item "If the message "INCOMPLETE" is displayed" in Section 11-3-4.

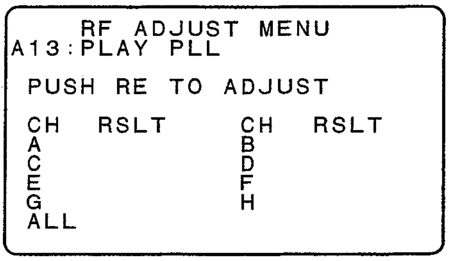
② To adjust the desired channel only

1. Insert a working tape (blank tape : BCT-60MX that is commercially available).
2. Select the channel to adjust and press the rotary encoder.
3. Result of adjustment appears for the selected channel only. (OK/NG is not displayed in the ALL column.)
   When STOP is pressed, data as of this timing is displayed.
   When the adjustment ends normally : OK is displayed.
   When the adjustment fails : NG is displayed.

A13 : PLAY PLL

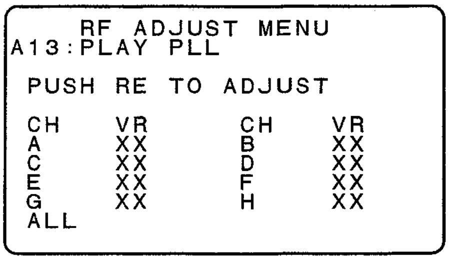
Adjusts the VCO free-running frequency of the playback PLL circuit that is used in the PLAY mode automatically.

1. Select "A13 : PLAY PLL" on the RF ADJUST MENU display and press the rotary encoder.



```
      RF ADJUST MENU
A13:PLAY PLL
 PUSH RE TO ADJUST
 CH   RSLT      CH   RSLT
 A              B
 C              D
 E              F
 G              H
 ALL
```

When the STOP button is pressed at this timing, the adjustment data as of this timing is displayed.
(XX is the 1-byte data.)



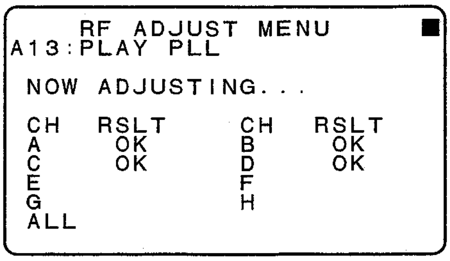
```
      RF ADJUST MENU
A13:PLAY PLL
 PUSH RE TO ADJUST
 CH     VR      CH     VR
 A      XX      B      XX
 C      XX      D      XX
 E      XX      F      XX
 G      XX      H      XX
 ALL
```

① To adjust all channels

1. Insert the alignment tape (MR5-1 : Part No. 8-960-077-01, MR5-1P : Part No. 8-960-077-51).
2. Select ALL and press the rotary encoder.
3. The adjustment starts.
   If the alignment tape is not inserted, the message "INSERT MR5-1/1P" appears and the cassette lid opens. When the alignment tape is inserted, and then the adjustment starts.

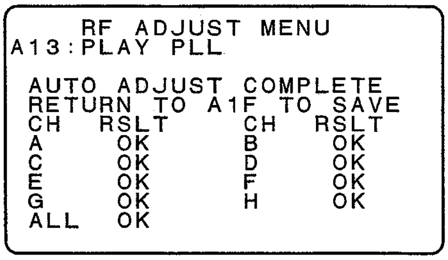
   Note

   If the message "WAITING ..." keeps appearing even though the automatic adjustment is started, the un-recorded segment might have been played back. In such a case, change the playback position of the alignment tape.



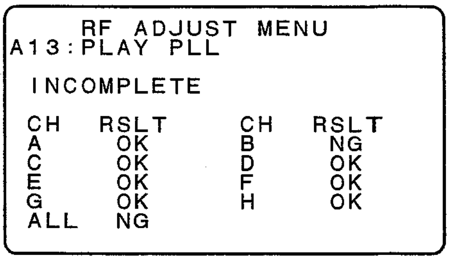
```
      RF ADJUST MENU         ■
A13:PLAY PLL
 NOW ADJUSTING...
 CH   RSLT      CH   RSLT
 A     OK       B     OK
 C     OK       D     OK
 E              F
 G              H
 ALL
```

4. The adjustment results of all channels are displayed. When STOP is pressed, data as of this timing is displayed.
   When the adjustment ends normally :
   OK is displayed in all channels and in the ALL column.



```
      RF ADJUST MENU
A13:PLAY PLL
 AUTO ADJUST COMPLETE
 RETURN TO A1F TO SAVE
 CH   RSLT      CH   RSLT
 A     OK       B     OK
 C     OK       D     OK
 E     OK       F     OK
 G     OK       H     OK
 ALL   OK
```

When the adjustment fails :
NG is displayed in the channel in which an error occurs and in the ALL ccolumn.



```
      RF ADJUST MENU
A13:PLAY PLL
 INCOMPLETE
 CH   RSLT      CH   RSLT
 A     OK       B     NG
 C     OK       D     OK
 E     OK       F     OK
 G     OK       H     OK
 ALL   NG
```

Note

When the message "INCOMPLETE" is displayed in both cases of ① and ②, refer to the item "If the message "INCOMPLETE" is displayed" in Section 11-3-4.

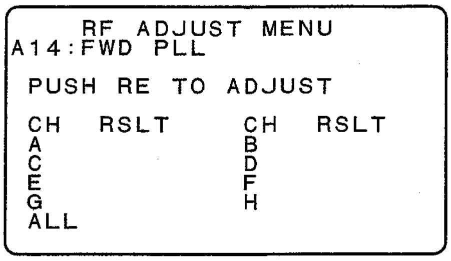
② To adjust the desired channel only

1. Insert the alignment tape (MR5-1/1P).
2. Select the channel to adjust and press the rotary encoder.
3. Result of adjustment appears for the selected channel only. (OK/NG is not displayed in the ALL column.)
   When STOP is pressed, data as of this timing is displayed.
   When the adjustment ends normally : OK is displayed.
   When the adjustment fails : NG is displayed.

A14 : FWD PLL

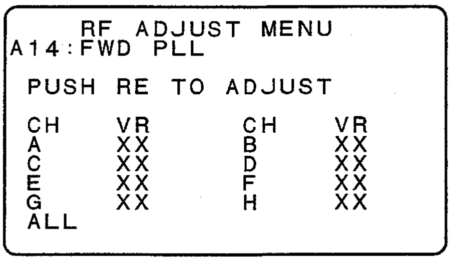
Adjusts the VCO free-running frequency of the playback PLL circuit that is used in the FWD mode automatically.

1. Select "A14 : FWD PLL" on the RF ADJUST MENU display and press the rotary encoder.



```
     RF  ADJUST  MENU
A14:FWD  PLL

 PUSH  RE  TO  ADJUST

 CH   RSLT       CH   RSLT
 A               B
 C               D
 E               F
 G               H
 ALL
```

When the STOP button is pressed at this timing, the adjustment data as of this timing is displayed.
(XX is the 1-byte data.)



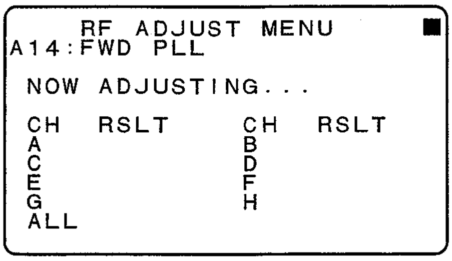
```
     RF  ADJUST  MENU
A14:FWD  PLL

 PUSH  RE  TO  ADJUST

 CH    VR        CH    VR
 A     XX        B     XX
 C     XX        D     XX
 E     XX        F     XX
 G     XX        H     XX
 ALL
```

① To adjust all channels

1. Insert the alignment tape (MR5-1 : Part No. 8-960-077-01, MR5-1P : Part No. 8-960-077-51).
2. Select ALL and press the rotary encoder.
3. The adjustment starts.
   If the alignment tape is not inserted, the message "INSERT MR5-1" (for NTSC, "INSERT MR5-1P" for PAL) appears and the cassette lid opens. When the alignment tape is inserted, "WAITING ..." appears and then the adjustment starts.

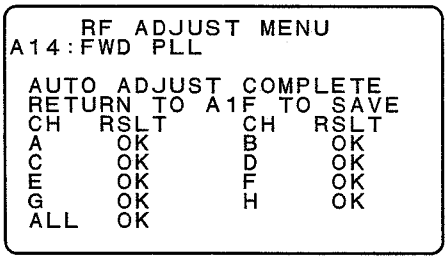
   Note

   If the message "WAITING ..." keeps appearing even though the automatic adjustment is started, the un-recorded segment might have been played back. In such a case, change the playback position of the alignment tape.



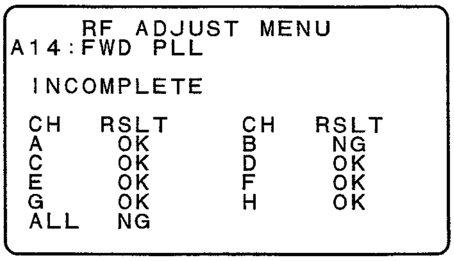
```
     RF  ADJUST  MENU       ■
A14:FWD  PLL

 NOW  ADJUSTING...

 CH   RSLT       CH   RSLT
 A               B
 C               D
 E               F
 G               H
 ALL
```

4. The adjustment results of all channels are displayed. When STOP is pressed, data as of this timing is displayed.
   When the adjustment ends normally :
   OK is displayed in all channels and in the ALL column.



```
     RF  ADJUST  MENU
A14:FWD  PLL

 AUTO  ADJUST  COMPLETE
 RETURN  TO  A1F  TO  SAVE
 CH    RSLT     CH    RSLT
 A      OK      B      OK
 C      OK      D      OK
 E      OK      F      OK
 G      OK      H      OK
 ALL    OK
```

When the adjustment fails :
NG is displayed in the channel in which an error occurs and in the ALL ccolumn.



```
     RF  ADJUST  MENU
A14:FWD  PLL

 INCOMPLETE

 CH    RSLT      CH    RSLT
 A      OK       B      NG
 C      OK       D      OK
 E      OK       F      OK
 G      OK       H      OK
 ALL    NG
```

Note

When the message "INCOMPLETE" is displayed in both cases of ① and ②, refer to the item "If the message "INCOMPLETE" is displayed" in Section 11-3-4.

② To adjust the desired channel only

1. Insert the alignment tape (MR5-1/1P).
2. Select the channel to adjust and press the rotary encoder.
3. Result of adjustment appears for the selected channel only. (OK/NG is not displayed in the ALL column.)
   When STOP is pressed, data as of this timing is displayed.
   When the adjustment ends normally : OK is displayed.
   When the adjustment fails : NG is displayed.

A15 : REV PLL

Adjusts the VCO free-running frequency of the playback PLL circuit that is used in the REV mode automatically.

1. Select "A15 : REV PLL" on the RF ADJUST MENU display and press the rotary encoder.

```
      RF  ADJUST  MENU
A15:REV  PLL
  PUSH  RE  TO  ADJUST
  CH   RSLT      CH   RSLT
  A              B
  C              D
  E              F
  G              H
  ALL
```

When the STOP button is pressed at this timing, the adjustment data as of this timing is displayed.
(XX is the 1-byte data.)

```
      RF  ADJUST  MENU
A15:REV  PLL
  PUSH  RE  TO  ADJUST
  CH    VR       CH    VR
  A     XX       B     XX
  C     XX       D     XX
  E     XX       F     XX
  G     XX       H     XX
  ALL
```

① To adjust all channels

1. Insert the alignment tape (MR5-1 : Part No. 8-960-077-01, MR5-1P : Part No. 8-960-077-51).
2. Select ALL and press the rotary encoder.
3. The adjustment starts.
   If the alignment tape is not inserted, the message "INSERT MR5-1" (for NTSC, "INSERT MR5-1P" for PAL) appears and the cassette lid opens. When the alignment tape is inserted, "WAITING ..." appears and then the adjustment starts.

   Note

   If the message "WAITING ..." keeps appearing even though the automatic adjustment is started, the un-recorded segment might have been played back. In such a case, change the playback position of the alignment tape.

```
      RF  ADJUST  MENU          ■
A15:REV  PLL
  NOW  ADJUSTING...
  CH   RSLT      CH   RSLT
  A              B
  C              D
  E              F
  G              H
  ALL
```

4. The adjustment results of all channels are displayed. When STOP is pressed, data as of this timing is displayed.
   When the adjustment ends normally :
   OK is displayed in all channels and in the ALL column.

```
      RF  ADJUST  MENU
A15:REV  PLL
  AUTO  ADJUST  COMPLETE
  RETURN  TO  A1F  TO  SAVE
  CH    RSLT     CH    RSLT
  A     OK       B     OK
  C     OK       D     OK
  E     OK       F     OK
  G     OK       H     OK
  ALL   OK
```

When the adjustment fails :
NG is displayed in the channel in which an error occurs and in the ALL ccolumn.

```
      RF  ADJUST  MENU
A15:REV  PLL
  INCOMPLETE
  CH    RSLT     CH    RSLT
  A     OK       B     NG
  C     OK       D     OK
  E     OK       F     OK
  G     OK       H     OK
  ALL   NG
```

Note

When the message "INCOMPLETE" is displayed in both cases of ① and ②, refer to the item "If the message "INCOMPLETE" is displayed" in Section 11-3-4.

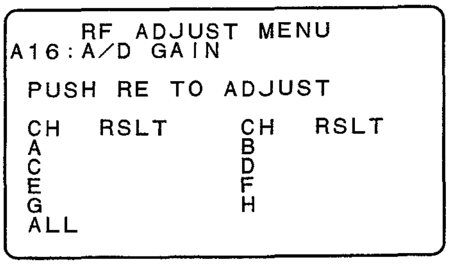
② To adjust the desired channel only

1. Insert the alignment tape (MR5-1/1P).
2. Select the channel to adjust and press the rotary encoder.
3. Result of adjustment appears for the selected channel only. (OK/NG is not displayed in the ALL column.)
   When STOP is pressed, data as of this timing is displayed.
   When the adjustment ends normally : OK is displayed.
   When the adjustment fails : NG is displayed.

A16 : A/D GAIN

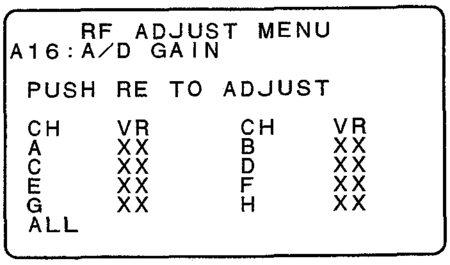
Adjusts gain of the A/D converter that is used to A/D convert the playback RF signal automatically.

1. Select "A16 : A/D GAIN" on the RF ADJUST MENU display and press the rotary encoder.



```
      RF  ADJUST  MENU
A16:A/D  GAIN
 PUSH  RE  TO  ADJUST
 CH   RSLT        CH   RSLT
 A                B
 C                D
 E                F
 G                H
 ALL
```

When the STOP button is pressed at this timing, the adjustment data as of this timing is displayed.
(XX is the 1-byte data.)



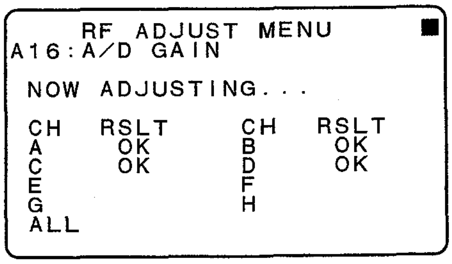
```
      RF  ADJUST  MENU
A16:A/D  GAIN
 PUSH  RE  TO  ADJUST
 CH     VR        CH     VR
 A      XX        B      XX
 C      XX        D      XX
 E      XX        F      XX
 G      XX        H      XX
 ALL
```

① To adjust all channels

1. Insert the alignment tape (MR5-1 : Part No. 8-960-077-01, MR5-1P : Part No. 8-960-077-51).
2. Select ALL and press the rotary encoder.
3. The adjustment starts.
   If the alignment tape is not inserted, the message "INSERT MR5-1" (for NTSC, "INSERT MR5-1P" for PAL) appears and the cassette lid opens. When the alignment tape is inserted, "WAITING ..." appears and then the adjustment starts.

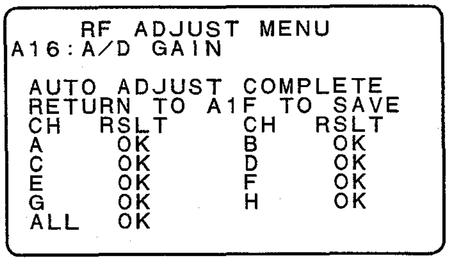
   Note

   If the message "WAITING ..." keeps appearing even though the automatic adjustment is started, the un-recorded segment might have been played back. In such a case, change the playback position of the alignment tape.



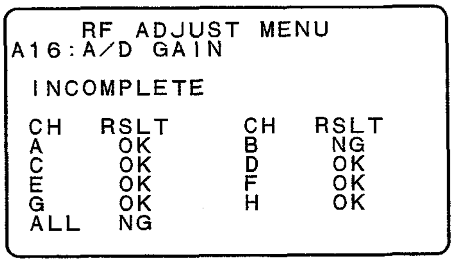
```
      RF  ADJUST  MENU          ■
A16:A/D  GAIN
 NOW  ADJUSTING...
 CH   RSLT        CH   RSLT
 A     OK         B     OK
 C     OK         D     OK
 E                F
 G                H
 ALL
```

4. The adjustment results of all channels are displayed. When STOP is pressed, data as of this timing is displayed.
   When the adjustment ends normally :
   OK is displayed in all channels and in the ALL column.



```
      RF  ADJUST  MENU
A16:A/D  GAIN
 AUTO  ADJUST  COMPLETE
 RETURN  TO  A1F  TO  SAVE
 CH   RSLT        CH   RSLT
 A     OK         B     OK
 C     OK         D     OK
 E     OK         F     OK
 G     OK         H     OK
 ALL   OK
```

When the adjustment fails :
NG is displayed in the channel in which an error occurs and in the ALL ccolumn.



```
      RF  ADJUST  MENU
A16:A/D  GAIN
 INCOMPLETE
 CH   RSLT        CH   RSLT
 A     OK         B     NG
 C     OK         D     OK
 E     OK         F     OK
 G     OK         H     OK
 ALL   NG
```

Note

When the message "INCOMPLETE" is displayed in both cases of ① and ②, refer to the item "If the message "INCOMPLETE" is displayed" in Section 11-3-4.

② To adjust the desired channel only

1. Insert the alignment tape (MR5-1/1P).
2. Select the channel to adjust and press the rotary encoder.
3. Result of adjustment appears for the selected channel only. (OK/NG is not displayed in the ALL column.)
   When STOP is pressed, data as of this timing is displayed.
   When the adjustment ends normally : OK is displayed.
   When the adjustment fails : NG is displayed.

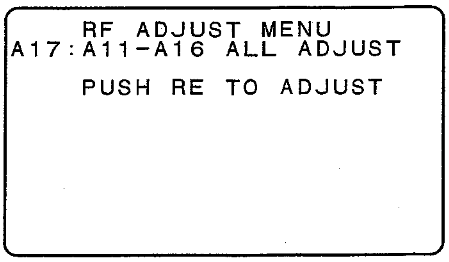
A17 : A11-A16 ALL ADJUST

Adjusts all of the items of A11 to A16 in this order.

1. Select "A17 : A11-A16 ALL ADJUST" on the RF ADJUST MENU display and press the rotary encoder.
2. Insert alignment tape (MR5-1 : Part No. 8-960-077-01, MR5-1P : Part No. 8-960-077-51).

   Note

   Be sure to use the alignment tape (MR5-1/1P).
   If a tape other than the specified tape is used for adjustment, the correct adjustment cannot be executed.

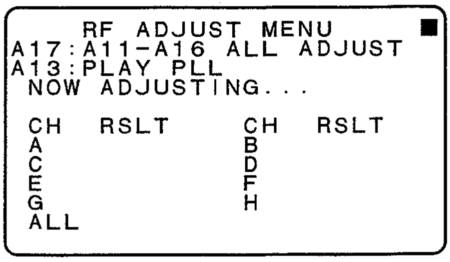


```
      RF ADJUST MENU
A17:A11-A16 ALL ADJUST

    PUSH RE TO ADJUST
```

3. The adjustment starts.
   If the alignment tape is not inserted, the message "INSERT MR5-1" (for NTSC, "INSERT MR5-1P" for PAL) appears and the cassette lid opens. When the alignment tape is inserted, "WAITING ..." appears and then the adjustment starts.
4. The adjustments are performed in the order starting from A13 : PLAY PLL, A16 : A/D GAIN, A11 : EQUALIZER, A14 : FWD PLL and A15 : REV PLL. (It takes about 3 to 4 minutes.)

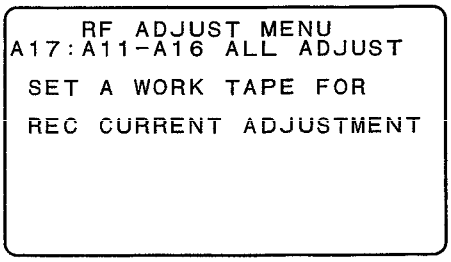
   Note

   When an error occurs in the middle of the adjustment, the adjustment is stopped at the timing when an error occurs. The subsequent adjustments will not be performed.



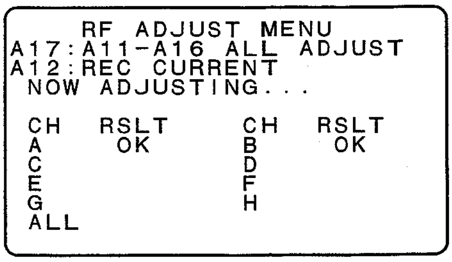
```
      RF ADJUST MENU     ■
A17:A11-A16 ALL ADJUST
A13:PLAY PLL
 NOW ADJUSTING...

 CH  RSLT       CH  RSLT
 A              B
 C              D
 E              F
 G              H
 ALL
```

5. When the A15 : REV PLL adjustment is complete, the alignment tape is ejected automatically.
6. Replace the alignment tape and insert a working tape (BCT-60MX) instead.



```
      RF ADJUST MENU
A17:A11-A16 ALL ADJUST

 SET A WORK TAPE FOR

 REC CURRENT ADJUSTMENT
```

7. The A12 : REC CURRENT adjustment starts automatically. (It takes about 4 to 5 minutes.)

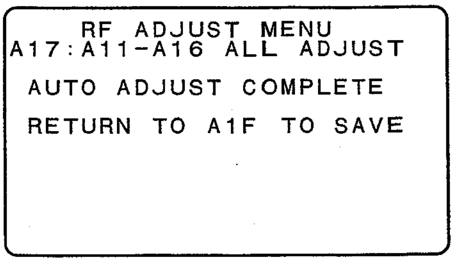


```
      RF ADJUST MENU
A17:A11-A16 ALL ADJUST
A12:REC CURRENT
 NOW ADJUSTING...

 CH  RSLT       CH  RSLT
 A    OK        B    OK
 C              D
 E              F
 G              H
 ALL
```

8. The adjustment results of all items are displayed. The tape is ejected automatically.
   When adjustment ends successfully, the message "COMPLETE" appears.
   When the adjustment fails, the message "INCOMPLETE" appears on the display of the item and the adjustment is stopped at the timing when an error occurs. The subsequent adjustments will not be performed.

   Note

   When the adjustment fails and the message "INCOMPLETE" appears, refer to the corresponding item that is described in this Section.



```
      RF ADJUST MENU
A17:A11-A16 ALL ADJUST

 AUTO ADJUST COMPLETE

 RETURN TO A1F TO SAVE
```

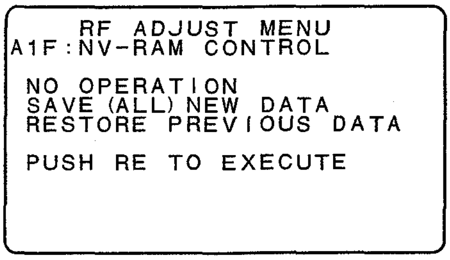
A1F : NV-RAM CONTROL

This is the menu that is prepared to save the RF system adjustment data in the NV-RAM (IC1104/EQ-88 board).
Executing this menu saves all of the RF system adjustment data in the NV-RAM at once. All of the RF system adjustment data can be returned to the original status before starting the adjustment by executing “RESTORE PREVIOUS DATA” if the data is not saved yet in the NV-RAM.

Note

If the message “INCOMPLETE” is displayed in the automatic adjustment, do not save the adjustment data in the NV-RAM (IC1104/EQ-88 board).

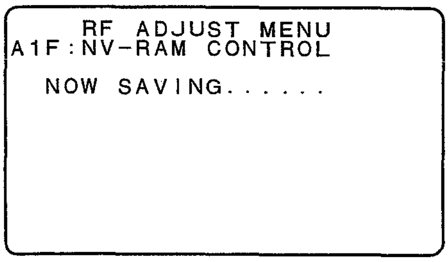
1. Select “A1F : NV-RAM CONTROL” on the RF ADJUST MENU display and press the rotary encoder.



```
      RF ADJUST MENU
A1F:NV-RAM CONTROL

  NO OPERATION
  SAVE (ALL) NEW DATA
  RESTORE PREVIOUS DATA

  PUSH RE TO EXECUTE
```

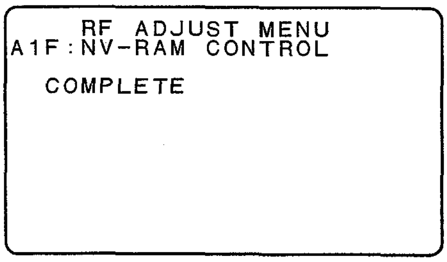
① To save the data

1. Select “SAVE (ALL) NEW DATA” and press the rotary encoder.



```
      RF ADJUST MENU
A1F:NV-RAM CONTROL

  NOW SAVING......
```

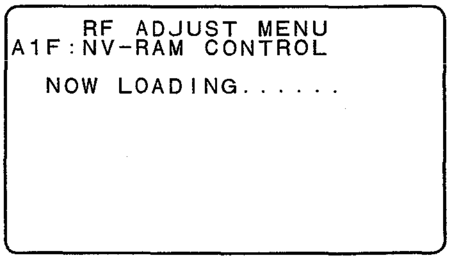
2. Saving is complete.



```
      RF ADJUST MENU
A1F:NV-RAM CONTROL

  COMPLETE
```

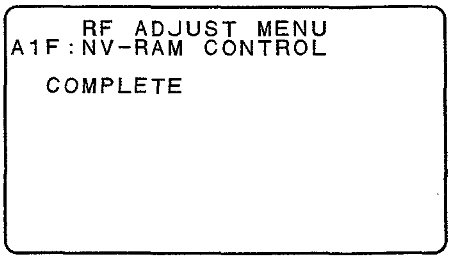
② To load the data

1. Select “RESTORE PREVIOUS DATA” and press the rotary encoder.



```
      RF ADJUST MENU
A1F:NV-RAM CONTROL

  NOW LOADING......
```

2. Loading is complete.



```
      RF ADJUST MENU
A1F:NV-RAM CONTROL

  COMPLETE
```

If the message "INCOMPLETE" is displayed

If the message "INCOMPLETE" is displayed while the respective adjustment menus are in progress from A11 to A17, check the following items in order.

- When the alignment tape is used, check if it is the specified (MR5-1 : Part No. 8-960-077-01, MR5-1P : Part No. 8-960-077-51) or not.
  → If it is not the specified tape, use the specified tape and implement the adjustment.
- Perform drum (video head) cleaning referring to **Note** of Section 11-2-2 C11: PB CH CONDITION and **Note** of C12 : REC CH CONDITION. When cleaning is already implemented, it is not necessary.
- If the message "INCOMPLETE" is displayed while executing any menu other than A17, implement the automatic adjustment using the A17 menu.

If the message "INCOMPLETE" is displayed even after the above adjustments are performed, check the following possible causes.

- Defective adjustment of the servo system, or servo circuit is defective.
  → Servo System Re-Alignment (A0 : SERVO ADJUST)
  → Servo System check (C0 : SERVO CHECK)
- The playback heads inside the drum assembly were worn out.
  → If required, replace the upper drum assembly or drum assembly.
- Defective adjustment of tape run system, or part mounting is defective.
  → Re-adjustment or re-installation
- EQ-88 board is defective.
- Drum assembly is defective.
- Brush/slip ring assembly is defective or its mounting is defective.
  → Replacement or re-installation
- Connection of the flexible board (between the MDR-14 board and the EQ-88 board) is defective.

11-3-5. Mechanism Adjustment Mode (A4 : MECHANISM ADJUST)

This menu sets the items that are required for mechanism adjustment.

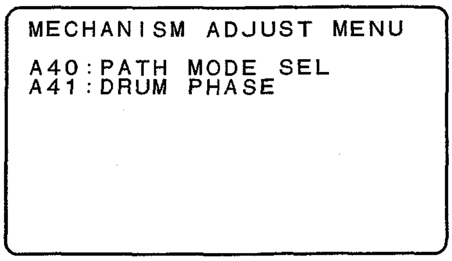
Note

Implement this menu item before starting the mechanism adjustment.

Operating procedure

1. Let the display show the top menu of VTR MAINTE menu. (Refer to Section 11-2-2.)
2. Press the rotary encoder. (When a cassette tape is inserted, it is ejected automatically.)
3. Select "A4 : MECHANISM ADJUST" and press the rotary encoder.

   The message MECHANISM ADJUST MENU appears.

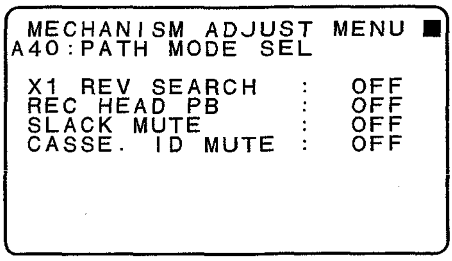


```
MECHANISM ADJUST MENU

A40:PATH MODE SEL
A41:DRUM PHASE
```

A40 : PATH MODE SEL

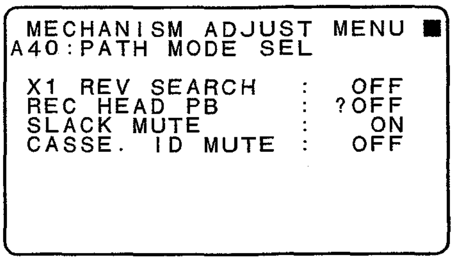
Contents of this menu item are all saved even after the VTR maintenance menu is set to OFF. However, the contents return to OFF when the main power is turned off.

1. Select "A40 : PATH MODE SEL" on the MECHANISM ADJUST MENU display and press the rotary encoder.
2. Select the desired item to change its setting and press the rotary encoder.



```
 MECHANISM ADJUST MENU ■
A40:PATH MODE SEL

 X1 REV SEARCH  :   OFF
 REC HEAD PB    :   OFF
 SLACK MUTE     :   OFF
 CASSE. ID MUTE :   OFF
```

3. The question mark (?) appears in the left of the ON/OFF.
4. Rotate the rotary encoder to switch ON/OFF. Press the rotary encoder to set ON/OFF.



```
 MECHANISM ADJUST MENU ■
A40:PATH MODE SEL

 X1 REV SEARCH  :   OFF
 REC HEAD PB    :  ?OFF
 SLACK MUTE     :    ON
 CASSE. ID MUTE :   OFF
```

Setting contents of each menu item

X1 REV SEARCH	OFF :	–4 times speed (normal SEARCH speed)
	ON:	–1 time speed
REC HEAD PB	OFF :	Normal playback
	ON:	Playback from the recording head
SLACK MUTE	OFF :	When an error occurs, an error code appears in the display window and the unit stops its operation.
	ON :	When an error occurs, an error code is not displayed and the unit does not stop its operation.
CASSE. ID MUTE	OFF :	Only the HD cassette tape and a cleaning cassette tape can be accepted.
	ON:	Any types of cassette tape can be accepted.

A41 : DRUM PHASE

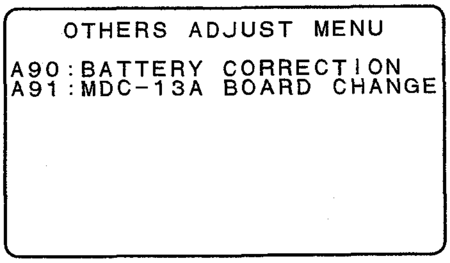
This menu item is exactly same as those of Section 11-3-3. SERVO System Adjustment Mode (A003 : DRUM PHASE). Refer to Section 11-3-3.

11-3-6. Other Adjustments (A9 : OTHERS ADJUST)

Implement this menu item only when the voltage drop due to internal circuit is going to be corrected and when the MDC-13A board is going to be replaced.

Operating procedure

1. Let the display show the top menu of VTR MAINTE menu. (Refer to Section 11-2-2.)
2. Confirm that a cassette tape is not inserted and press the rotary encoder.
3. Select "A9 : OTHERS" and press the rotary encoder. The message OTHERS ADJUST MENU appears.

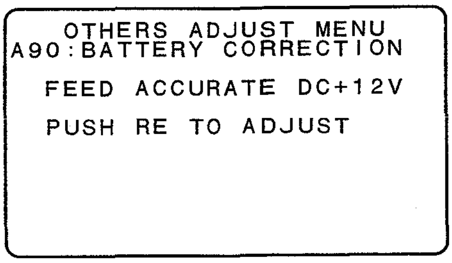


```
   OTHERS ADJUST MENU
A90:BATTERY CORRECTION
A91:MDC-13A BOARD CHANGE
```

A90 : BATTERY CORRECTION

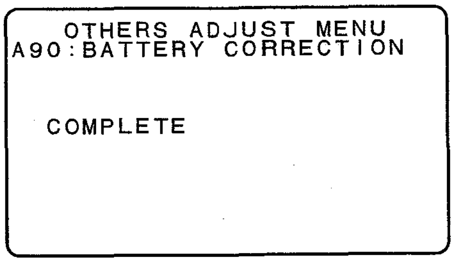
Flows the exact +12 V current in order to correct the voltage drop due to internal circuit.

1. Select "A90 : BATTERY CORRECTION" and press the rotary encoder.



```
   OTHERS ADJUST MENU
A90:BATTERY CORRECTION
  FEED ACCURATE DC+12V
  PUSH RE TO ADJUST
```

2. Press the rotary encoder again. The adjustment ends.



```
   OTHERS ADJUST MENU
A90:BATTERY CORRECTION

  COMPLETE
```

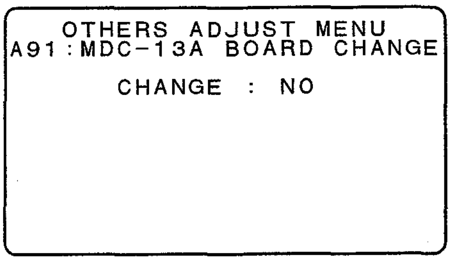
A91 : MDC-13A BOARD CHANGE

This item performs the setting that enables saving the contents of the backup RAM into the EEPROM (IC403) of the new replacement MDC-13A board when the MDC-13A board is going to be replaced.

Note

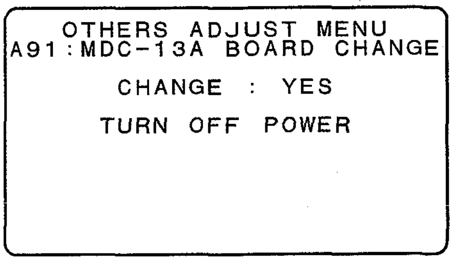
Perform this setting immediately before replacing the MDC-13A board.
When this setting is performed, the contents of the backup RAM are saved in the EEPROM at the first power-on after the MDC-13A board is replaced.

1. Select “A91 : MDC-13A BOARD CHANGE “ and press the rotary encoder.
2. When the rotary encoder is rotated, NO changes to YES.



```
     OTHERS ADJUST MENU
A91 :MDC-13A BOARD CHANGE
       CHANGE  :  NO
```

3. When the YES message appears, turn off the main power once.
4. Replace the MDC-13A board.
5. Turn on the main power.
   Note
   For the replacement procedure of the MDC-13A board, refer to “7-36. MDC-13A Board Replacement”.



```
     OTHERS ADJUST MENU
A91 :MDC-13A BOARD CHANGE
       CHANGE  :  YES
      TURN OFF POWER
```

16554
Printed in Belgium
2002. 10 16

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MSW-900
MSW-900P (SY) E
9-967-945-03

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